



COMMUNITY VALUES AND MANAGEMENT PREFERENCES
FOR THE SANTA CRUZ RIVER IN PIMA COUNTY, ARIZONA
BETWEEN GRANT ROAD AND TRICO ROAD



About the Sonoran Institute

Support the Sonoran Institute

Your support preserves the environment for future generations and makes a lasting impact in communities across Western North America. Learn more about how you can help at SonoranInstitute.org/donate.

The Mission of the Sonoran Institute

Sonoran Institute has worked on the Santa Cruz River since our founding in 1990. The Sonoran Institute's mission is to connect people and communities with the natural resources that nourish and sustain them. We work at the nexus of commerce, community, and conservation to help people in the North American West build the communities they want to live in while preserving the values which brought them here. We envision a West where civil dialogue and collaboration are hallmarks of decision making, where people and wildlife live in harmony, and where clean water, air, and energy are assured.

Connect With Us

Go to SonoranInstitute.org to learn about our programs, history, and recent news.
Or find us on Social Media:



facebook.com/sonoraninstitute



[@sonoraninstitute](https://twitter.com/sonoraninstitute)



[SonoranInstituteFlix](https://www.youtube.com/SonoranInstituteFlix)



[@sonoraninstitute](https://www.instagram.com/sonoraninstitute)



Our Vision for the Santa Cruz River

The Santa Cruz River, from Mexico to Marana, is a living, flowing river and the foundation of community health and prosperity.

Sonoran Institute Offices

MAIN OFFICE

100 N. Stone Ave., Suite 400
Tucson, Arizona 85701
520.290.0828

PHOENIX OFFICE

11010 N. Tatum Blvd., Suite D101
Phoenix, Arizona 85028
602.393.4310

MEXICO OFFICE

Ave. Graciela #654, Col. Residencias
Mexicali, Baja California CP.21280

Acknowledgements:

The content in this report was collected by Sonoran Institute in collaboration with Pima County, and with generous support from community members.

A four-page summary is available at:

sonoraninstitute.org/resource/our-living-river-community-values/

This report includes an overall analysis of the results and provides summary of how different user groups and zip codes responded. Please note the sample size of each sub-group varies, and may not be large enough to make accurate inferences for all groups. This report makes statements only when supported by a large sample. Please contact Sonoran Institute for more information.



Contents

About The Sonoran Institute	1
A Need for Raised Awareness of the Santa Cruz River	3
Methods and Findings by Topic Area	
Topic 1: Knowledge and Areas of Interest	7
Topic 2: River Values	9
Topic 3: Management Preferences	16
Topic 4: Where and How the River is Used	24
Final Recommendations	43
Appendices	
A- Survey Formatting, Vetting, and Outreach	44
B- Further Discussion Notes & Participant Comments	45
C- Additional Survey Results	61
D- Interactive Map Questions	66
E- ArcGIS Data and Additional Maps	68

Image Credits: front and this page:
©Bill Hatcher/Sonoran Institute, 2018;
back page: Sonoran Institute

A Need for Raised Awareness of the Santa Cruz River

The Santa Cruz River is a unique river in Southeastern Arizona that provides numerous benefits including rare wildlife habitat, aquifer recharge, and recreation opportunities. The river is part of our regional economy by supporting business development, boosting tourism, and increasing property values. Since the 1950s, drought and aquifer over-draft reduced the amount of flowing sections to two reaches in the United States, including 23 miles in Tucson and Marana. The primary source of the water in this part of the Santa Cruz River comes from two Pima County wastewater reclamation facilities which release highly treated recycled water into the river channel daily.

Releasing effluent into the river has led to the critical restoration of our flowing river ecosystem and the creation of a growing community amenity.

However, the release of effluent into the river is not a guarantee for the future. As the quality of effluent improves, the water in the river becomes acceptable for wider uses and could be diverted for use off-channel. Already there are several plans that could change the volume and location of water released into the river. While many proposals have some positive benefits for the region, they could leave less water in part or all the river. This could change the vitality of the flowing river, affect the cooling benefits of riparian vegetation, impact the enjoyment of the scenic river parks, and impede the return of wildlife to the river. How might the community respond to these potential changes?

There is a need to increase coordinated management approaches and a better understanding of the value of the Santa Cruz River. Understanding public values and desired conditions for the river can provide a critical foundation for a management strategy that will help balance potential competing priorities, in addition to identifying desired capital improvement projects.

In response to these circumstances, an expanded outreach effort was initiated to increase awareness of river conditions while simultaneously developing a vision of what the community would like to see along the Santa Cruz. Heightening awareness of the river and possible futures will ensure that it continues to be an amenity that benefits our region and reflects our community values.

Community Engagement Outreach Strategy

A community engagement strategy was undertaken to collect public feedback regarding the stretch of river from Grant Road to Trico Road. This input was intended to serve two purposes. First to help define a vision for the river as a community amenity and second to increase public awareness of the Santa Cruz River and the environmental, economic, and recreational opportunities that it provides.

The community engagement process consisted of two main components 1) an online survey with interactive maps and 2) a series of workshops along the river.

The survey was developed and hosted by Sonoran Institute, with funding from and considerable collaboration with Pima County Regional Flood Control District. Many other river stakeholders and citizen groups participated in the development of the survey and vetting questions. An interactive map was made by Sonoran Institute to help identify where and how the river is used for recreation, and values about the river. The survey and interactive maps were released online in August and remained open until the end of October.

In early October, Sonoran Institute led three workshops to discuss the preliminary results of the survey and encourage further use of the maps. Each workshop focused on a reach of the river, following the three reaches identified in the *Living River* reports (Figure 1).

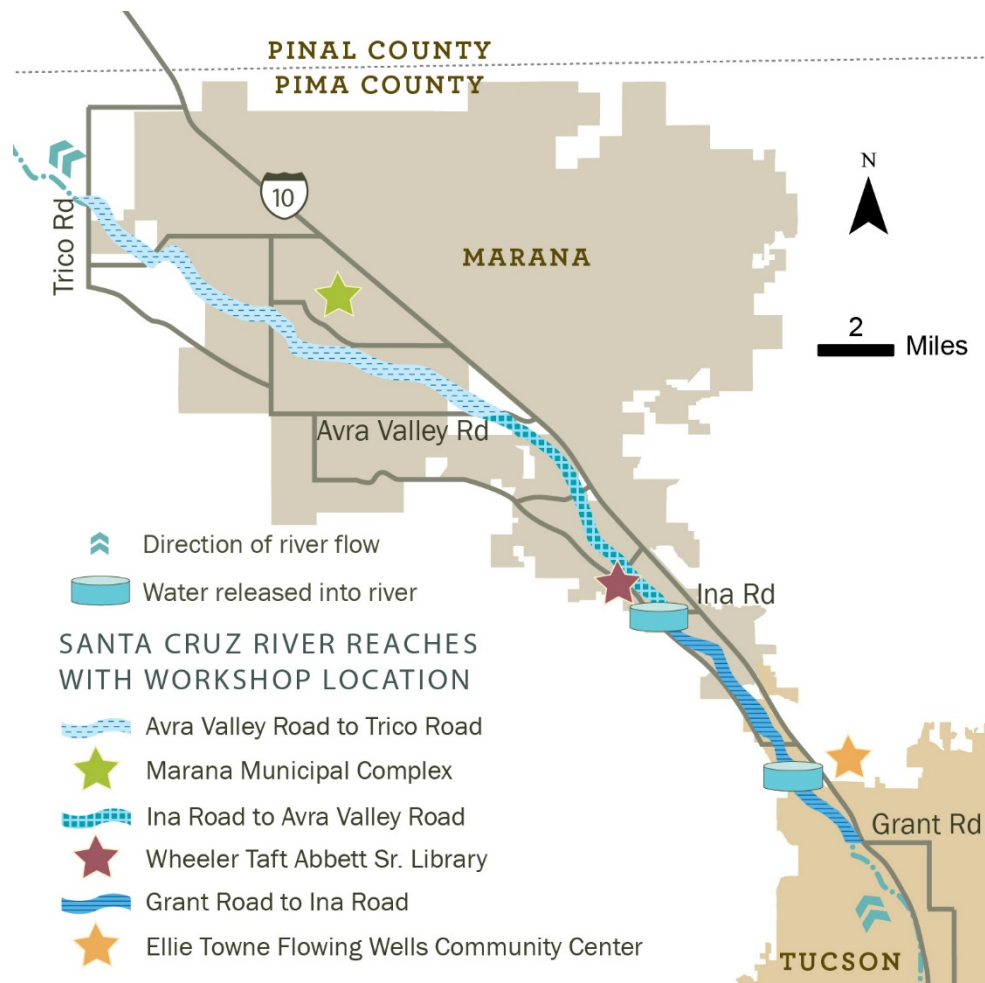


Figure 1 - River reaches and workshop locations

Outreach efforts focused on all Pima County residents but targeted the communities that lived near the flowing section of the Santa Cruz River. We used Grant Road and Trico Road as project area boundaries so that the results would be directly relevant for Pima County Regional Flood Control District (RFCD) as they develop a management plan for that section of river.

The Santa Cruz River has many interested stakeholders, including resource managers (both public and non-profit sector), recreationalists, environmental advocates, and community members. Knowing that these results could be of interest for many, Sonoran Institute asked many organizations to review the survey drafts for clarity and to add questions that would be useful for their work.

A variety of outreach approaches were used to reach the broadest audience, as well as targeted groups. This included using a variety of media outlets and partnering with local jurisdictions to encourage

residents to respond to the survey. The diverse responses were a tribute to a multi-pronged outreach effort.

A list of invited stakeholders and the primary modes of outreach and promotion are included in Appendix A.

Who Participated

Approximately 550 individuals participated in the community engagement process. The survey and interactive map was administered from August to October 2017 and collected 510 responses. Figures 2, 3, and 4 describe the survey respondents.

Most survey respondents self-reported relatively high levels of familiarity with the river, indicating most of the survey takers were relatively well informed. The outreach efforts were also effective in engaging new audiences since 17% described themselves as either not familiar or a little familiar.

Survey takers were asked to select from a list of user group categories which best described their relationship to the river. All user types responded. The provided categories included the most common recreational activities (such as bike riding), environmental advocate, neighbor, or being a resource manager and an “other” write-in category.

The survey recorded the zip code of participants. Most survey respondents reported zip codes near the focus area.

Three workshops were held in different areas of the river to further refine the survey responses with local input. Approximately 45 residents participated in the workshop. According to the sign in sheets, the workshops were attended by mostly private citizens and a few known stakeholders. Table 1 describes the workshops.

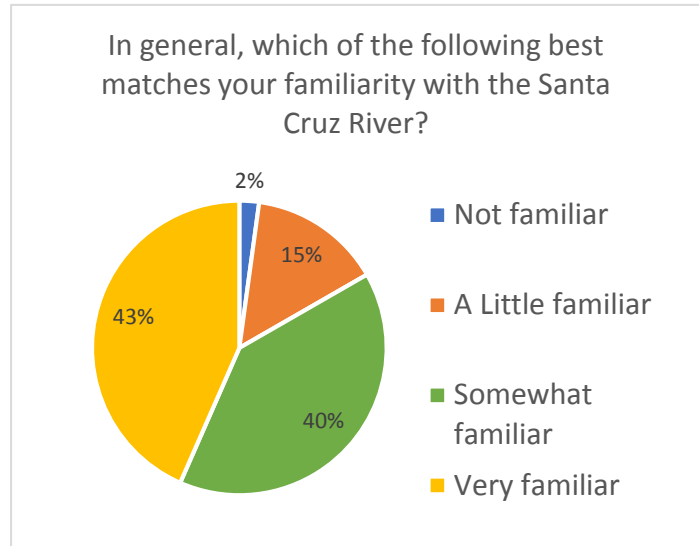


Figure 2 – Survey respondents' level of familiarity

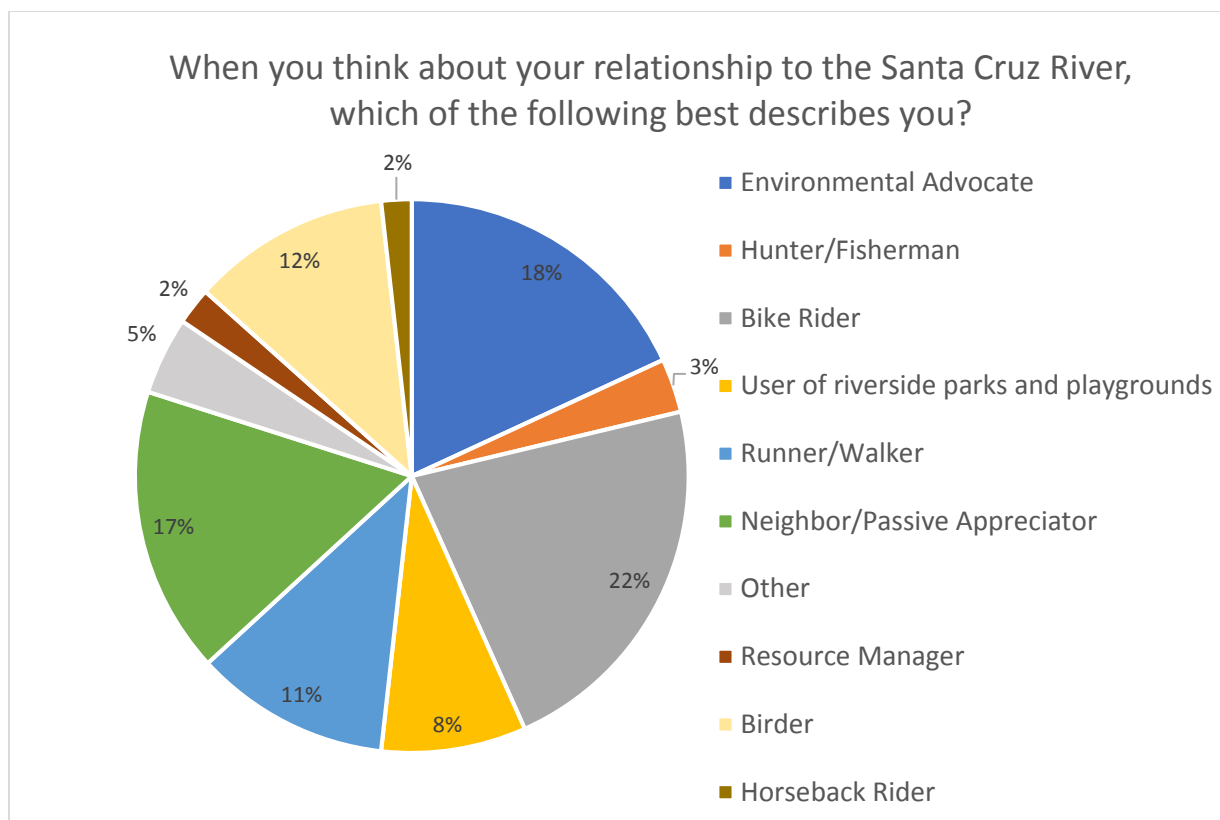


Figure 3 – Self-determined “user groups” that responded to the online survey

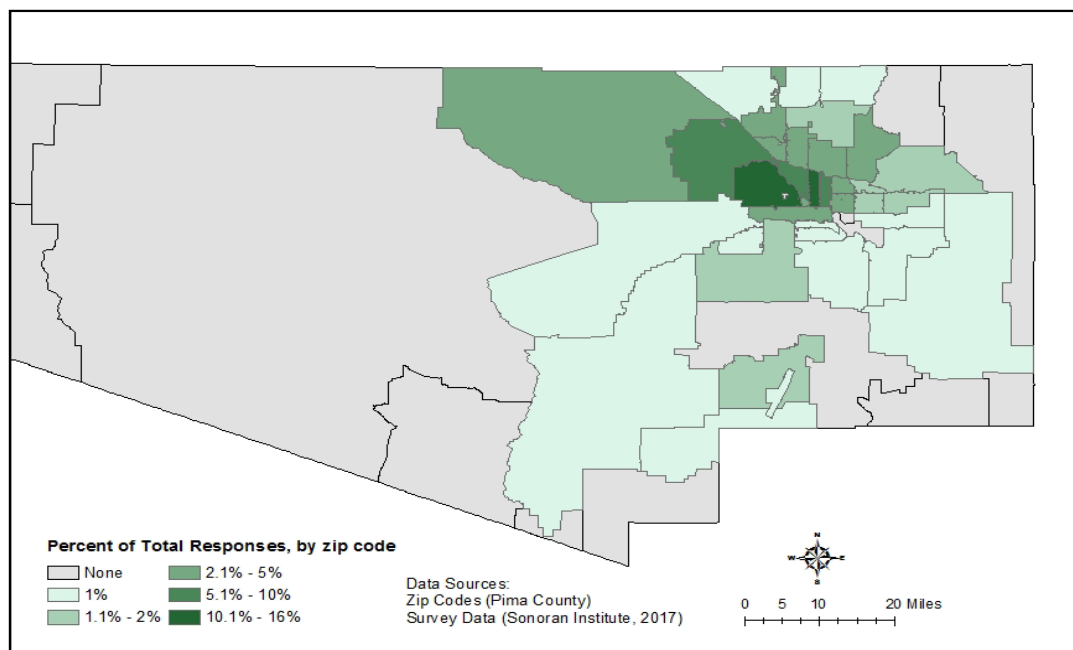


Figure 4 – Survey respondent locations by zip code

	Focus Reach	Meeting Location	# of Attendees
Workshop 1	Grant – Ina	Ellie Towne Flowing Wells CC	11
Workshop 2	Avra Valley – Trico	Marana Municipal Center	5
Workshop 3	Ina – Avra Valley	Wheeler Abbott Taft Sr Library	21

Table 1 – Number of workshop attendees

Methods and Findings by Topic Area

The remaining section of this report will describe the methods and findings of the four primary topic areas.

Topic 1: Knowledge and Areas of Interest

The first goal of the community engagement work was to gauge the level of knowledge of the Santa Cruz River and to raise awareness of the role of effluent in the river. To accomplish this goal, survey participants were given the option of viewing an educational video, and each workshop started with an informal “mini-quiz” about the river and a discussion. The conclusions of this topic help resource managers understand public perception and may guide future communication about their work.

Video in survey results

Pima County Communications created an eight-minute educational video on the Santa Cruz River.

The video was played near the onset of the online survey to gauge the participants level of familiarity with Santa Cruz River topics and to inform viewers. This section started with a self-assessment of the participants familiarity with the Santa Cruz River, and then they were given the option to watch the video or to skip and go straight to the Values and Management Objectives portion of the survey.

Approximately 65% (335 individuals) of survey respondents opted to view the video. There were no special groups or qualities that were more likely to watch an educational video. The level of familiarity, user groups, and locations of those who did watch the video were proportional to those who skipped the video.

Video viewers were provided with a basic outline of video topics and were instructed to indicate which topics were either a) new information b) interesting and/or c) important. They could check multiple categories per outline item. The video out was an introduction that talked about the role of effluent in the river for year-round flow, a summary of current conditions and recent improvements, the history of the river, health and safety of nearby communities, and the need to secure water for the river.

Figure 5 shows the viewers responses while watching the video. The least familiar topic area was the improved water quality resulting from the Pima County wastewater treatment facility upgrades. Of the 331 video-viewers, 37% reported this as new or unfamiliar information. The most interesting topics included the historic uses of the river and the cultural heritage aspects; 61% of viewers reported this topic as “interesting to me.”

The video is available on Youtube: www.tiny.cc/livingrivervideo2017

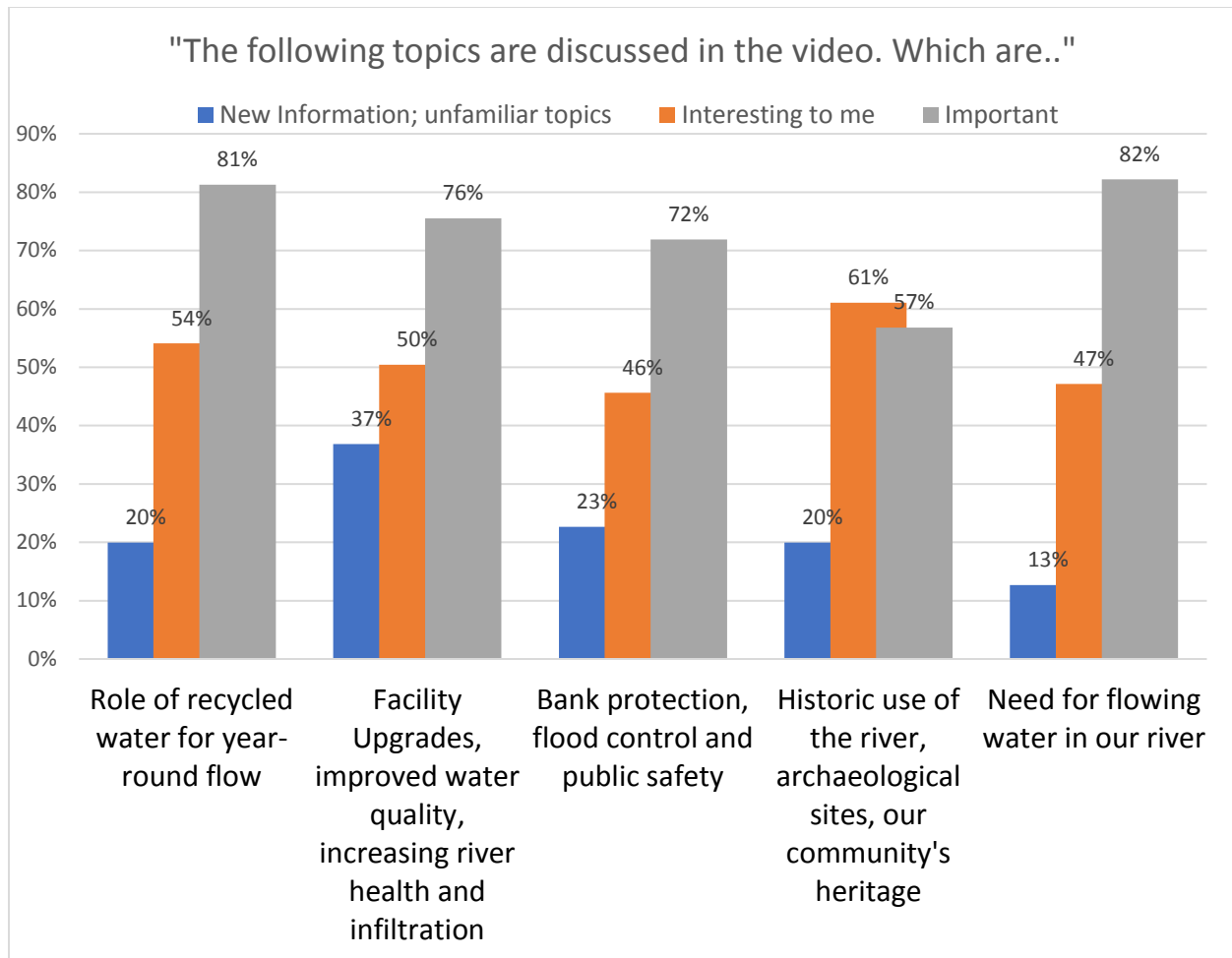


Figure 5 – Video Responses (n=331)

Informal mini-quiz results

Each workshop started with an informal mini-quiz to measure the workshop attendees' level-of knowledge was measured during at the onset of each workshop. Additional goals were to start conversation, clear up some misconceptions, cover basic facts about the Santa Cruz, and to help the presenter get to know the participants. The mini-quiz covered simple questions about river locations, the health of the river, water ownership, the definition of effluent. The quiz was presented in a three-step approach of 1) attendees guessing at the answer, 2) hearing the correct information, and 3) reflection.

The level of familiarity findings from the mini-quiz are primarily anecdotal because answers were discussed as a group. It was observed that most knew the direction of flow and where to see water. There were some mixed answers about whether there were fish in the river. Many people knew what effluent meant, but the ownership of the water in the river was not well understood.

Topic 1 Observations

- The role of recycled water in the river and the future of the river are of high value to the community.
- That the river has improved over time was marked as the least familiar topic area. This indicates a priority for public education and should continue to be a primary message of the Living River project.
- The history of the river and its role in Tucson's cultural heritage was ranked as the most interesting aspect of the river; however, it was not ranked as highly important. Celebrating the river's history and noting cultural heritage sites along the river may be a method to increase the value of the river among wider audiences.
- The mini-quiz showed that workshop attendees had a basic understanding of river geography but were less familiar with water resource management topics.

Topic 2: River Values

This topic area illustrates the aspects of the river that Pima County communities would like to protect or enhance. Rivers and open space provide many benefits to the surrounding communities. It is important to understand which aspects are of high value, so resource managers may make decisions to protect, support, or enhance those characteristics.

Survey respondents marked the extent to which they agreed with various value statements about the river. Table 3 lists the full statements used in the survey questions. The topics covered by the values statements were determined through vetting with land managers, drawing upon current and anticipated project needs, findings from other regional surveys, and frequently discussed topics. This section was limited to ten statements for brevity. The order in which these statements were presented in each survey was randomized to reduce the effect that the order of statements may have had on the results.

Response	Multiplier
Strongly disagree	-2
Somewhat disagree	-1
Neutral/No Opinion	0
Somewhat agree	1
Strongly agree	2

Table 2 – Values analysis multipliers

The results from the first seven weeks were analyzed and a summary of the preliminary findings were presented to the workshop attendees. Guided small group discussions focused on overall impressions and interpretation, understanding surprising results, and any additional concerns that need to be addressed.

The following process was used for calculating the average score for each value statement: 1) assigning a multiplying factor to each response that gives an appropriate weight to that response, see Table 2. 2) multiply the frequency of that response by the assigned multiplier; 3) sum the products of step 2; 4) divide by the number of people who responded to that specific management objective category to get the final average. This last step was critical as some value statements were occasionally skipped, so always dividing by the total number of survey responses would have skewed the results.

Please indicate how much you agree with the following statements about this stretch of the Santa Cruz River (Grant Road to Trico Road).

- Open Space: Connecting with nature is important to me. I enjoy the river wildlife and plants.
- Water Supply: Water in the river corridor is ideal for replenishing our groundwater supply for future use in cities.
- Environmental Resiliency: The river corridor helps keep air temperatures cool and is important for adapting to a changing climate.
- Cultural Identity: We should preserve this part of our cultural history and identity for future generations.
- Commuting/Exercise: The river corridor and paved path is a convenient way for me to get exercise and/or travel.
- Naturalness: The river corridor should be free of non-native invasive plants and animals.
- Flood Safety: It is important that the river corridor is managed to protect the public and property from floods.
- Community: I like to socialize and/or spend quality time with my family at the river or riverside parks.
- Financial Benefit: My property or business has added value or generates profit because of the river corridor.

Table 3 – Full statements survey respondents read about river values

River Values Survey Results – All Survey Responses

To make clear comparisons across value statements, the data were streamlined into an average, final scores show in Figure 6. Figure 7 illustrates all survey responses.

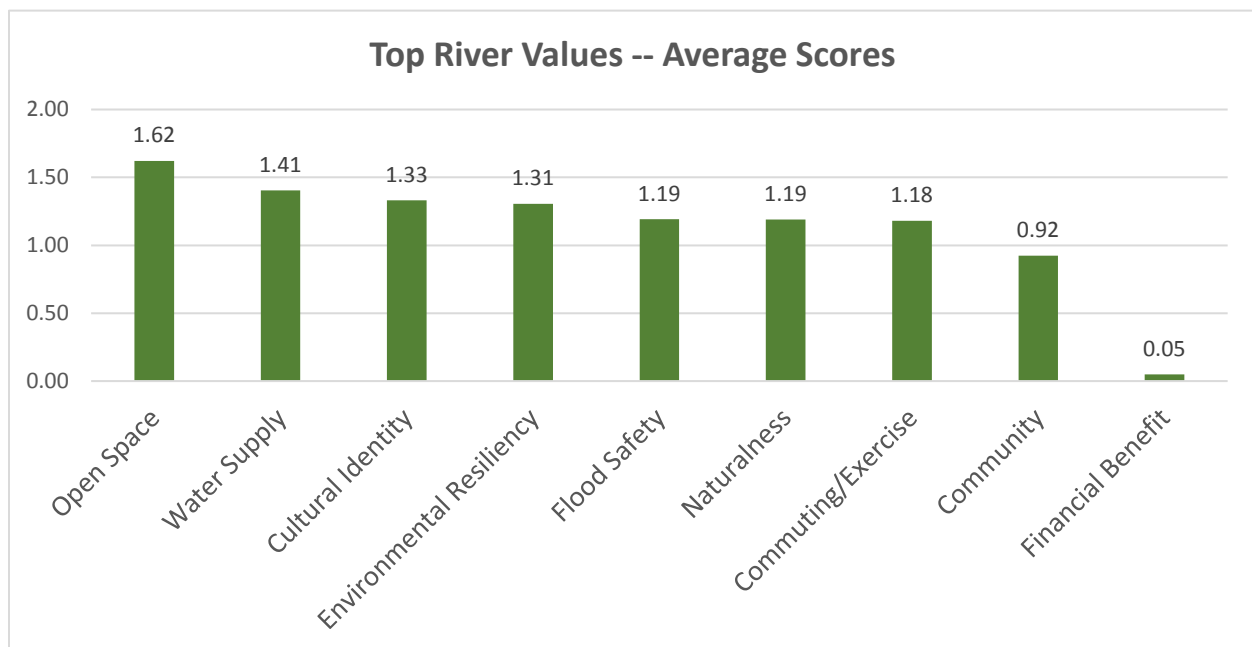


Figure 6 – Average scores of river values, all survey responses (n=510)

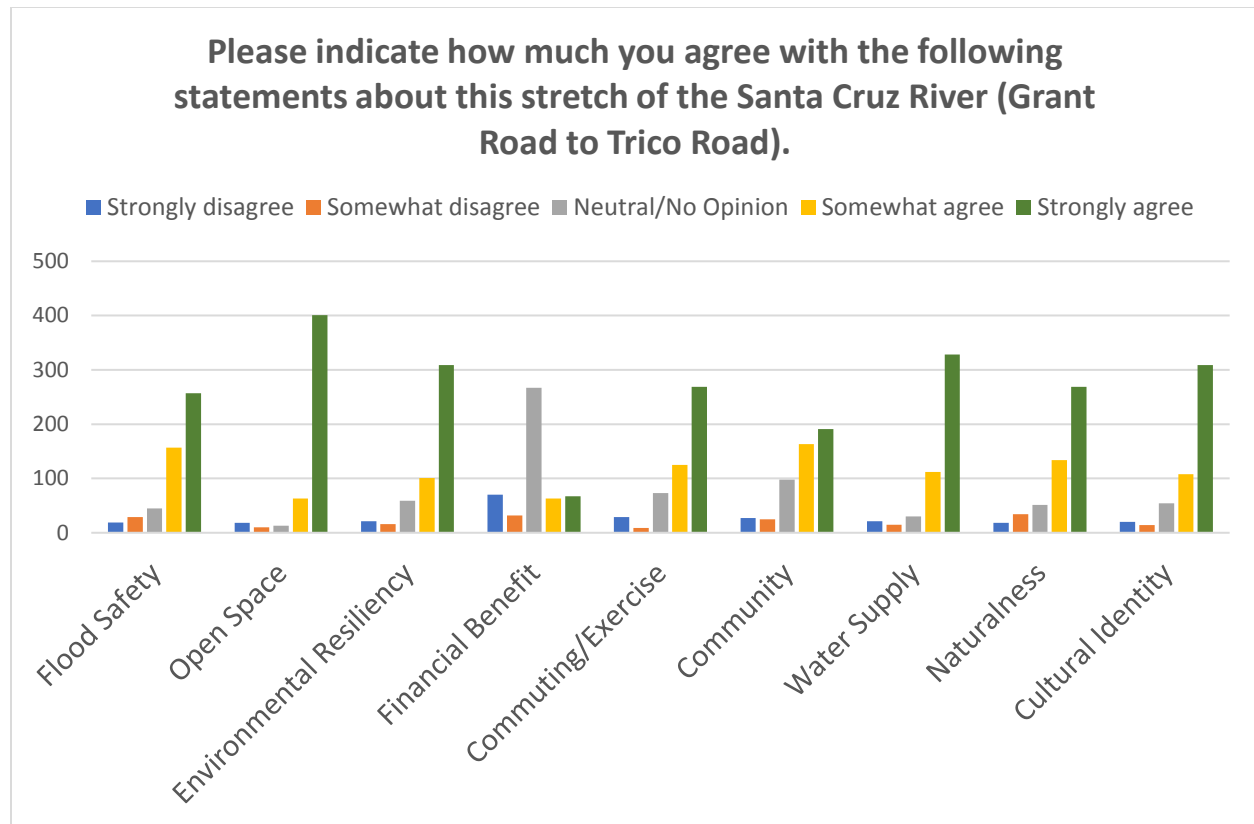


Figure 7– River values as reported in the survey, all survey responses (n=510)

River Values Survey Results – by User Group

Survey results were analyzed by the self-described user group (Figure 8). Sample sizes of each group are listed in Table 4. For the complete survey results organized by user groups, please see Appendix C.

User Group Sample Sizes				
User of Riverside Parks / Playgrounds	N = 42		Environmental Advocate	N = 91
"Other" User	N = 23		Horseback Rider	N = 8
Runner / Walker	N = 58		Hunter / Fisherman	N = 17
Resource Manager	N = 11		Bike Rider	N = 110
Neighbor / Passive Appreciator	N = 81		Birder	N = 59

Table 4 – Survey respondent sample size by user group

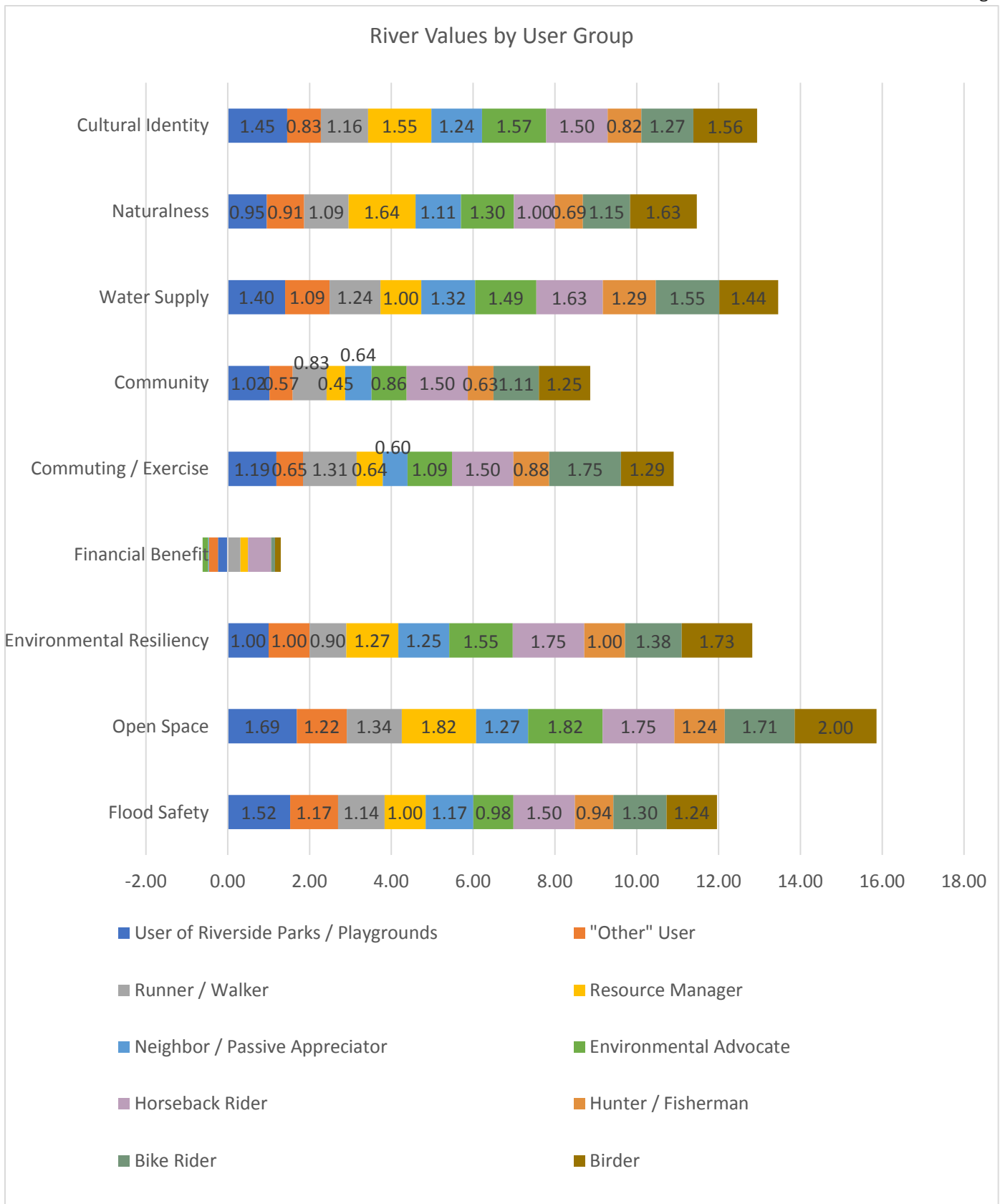


Figure 8 – River Values by user group

Community Values and Management Preferences

River Values Survey Results – by Geography

Survey results were analyzed for place-based trends using zip codes to approximate geographies and commonly used regional names. This section reports data from only the project area and three subreaches defined in the *Living River* reports (Table 5). Figure 9a shows values of the project area, and Figure 9b and Table 6 show the results from each subreach. For more results of additional geographies, see Appendix C.

Project Area River Reaches	Zip Codes		
Three Rivers (n=129)	85741*	85705	85745
Cortaro Narrows (n=68)	85741*	85742	85743
Marana Flats (n=18)	85653	85658	
*Due to considerable spatial overlap, 85741 was averaged into two reaches.			

Table 5 – River reaches and associated zip codes

	Open Space	Water Supply	Cultural Identity	Flood Safety	Commuting/ Exercise	Environmental Resiliency	Naturalness	Community	Financial Benefit
Three Rivers Reach (n=129)	1.57	1.42	1.28	1.18	1.19	1.29	1.11	0.82	0.10
Cortaro Narrows (n=68)	1.54	1.26	1.17	1.24	1.25	1.07	1.03	1.01	0.24
Marana Flats (n=18)	1.53	1.26	0.84	1.16	1.06	0.72	0.89	0.79	0.00
Project Area (n=215)	1.55	1.36	1.21	1.20	1.20	1.17	1.07	0.88	0.13

Table 6 – Average scores for river values by river reach and project area

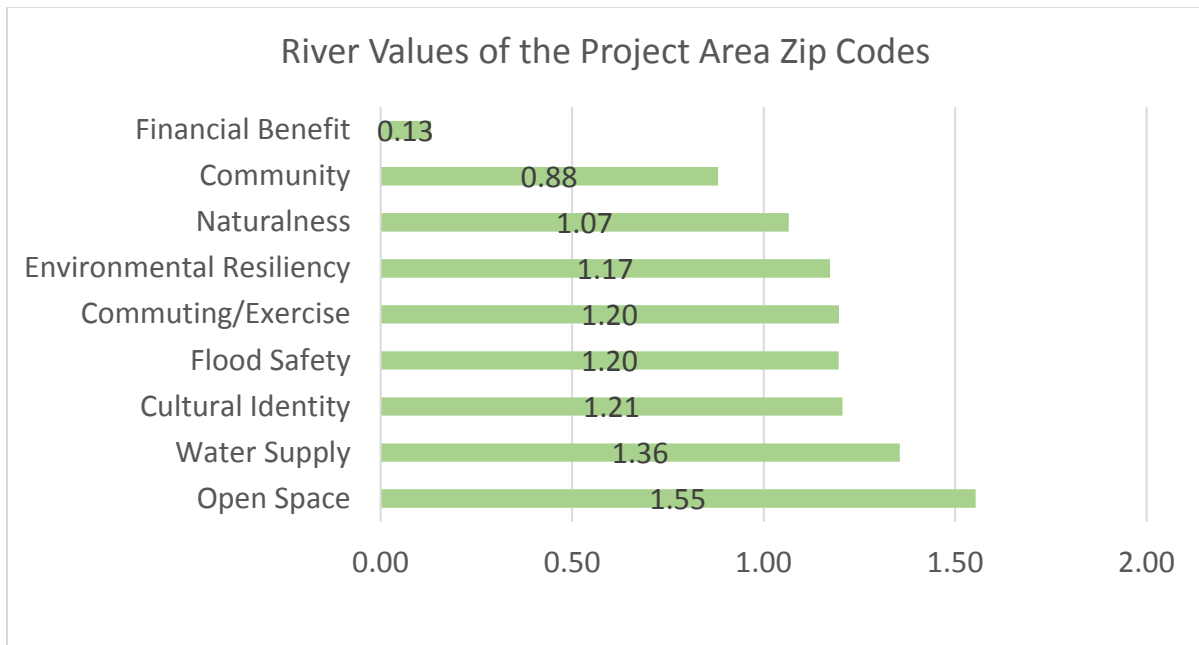


Figure 9a – River values in the project area as a whole (n=215)

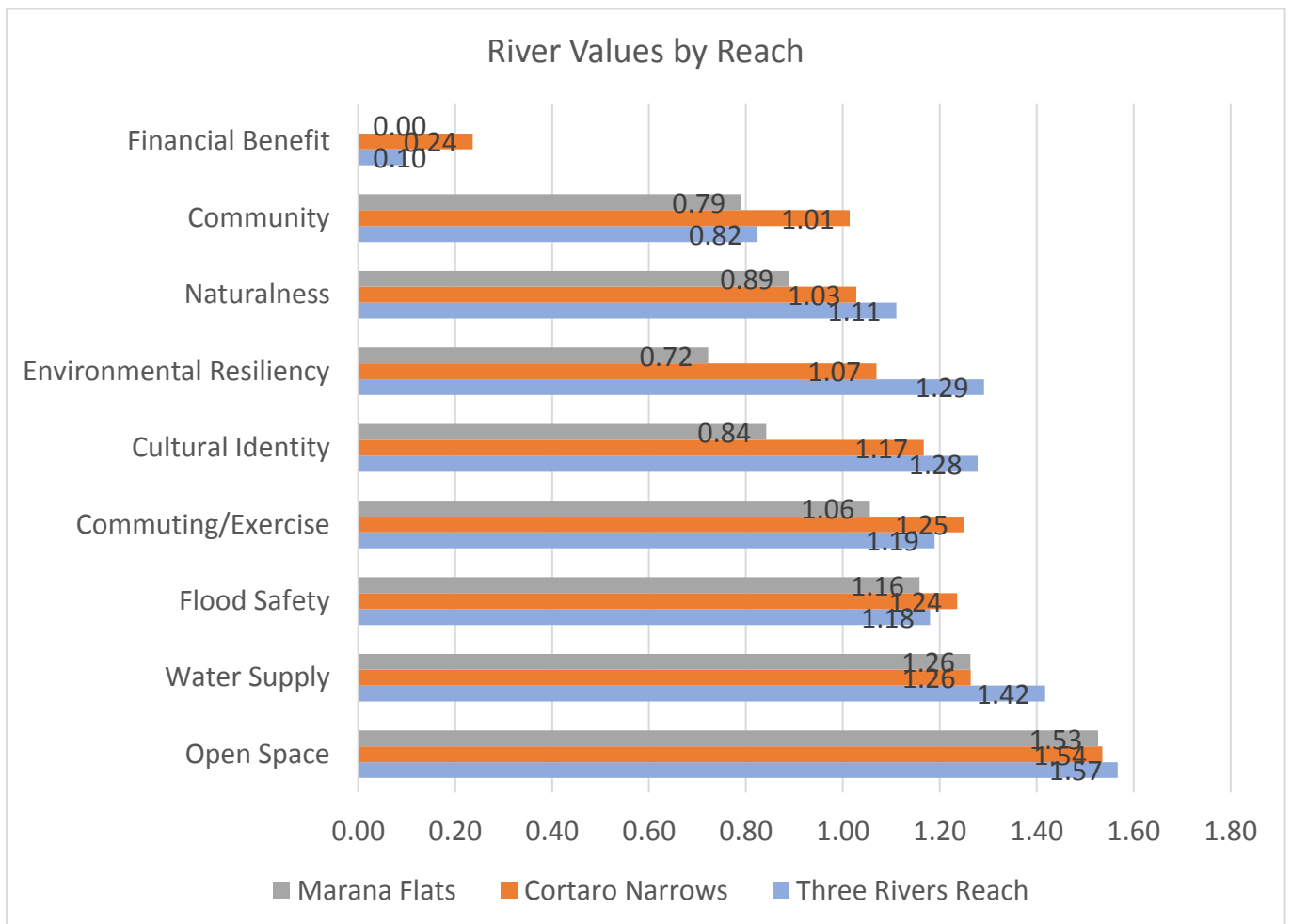


Figure 9b – Average scores for river values by river reach

Workshop discussion:

The survey results were shown to attendees of each workshop. Then a subset of them discussed the values results. The following are the insights made by workshop attendees about the survey results on values. These observations offer a deeper understanding on what the numerical survey data may mean. They were specifically asked for their input on the financial benefits result. For more notes related to workshop discussions please see Appendix B – Additional Discussion. There you will also see the comments submitted in the online survey.

Financial Benefit:

The Financial Benefit statement intentionally asked about personal benefit, which limited the scope of the benefits that would be considered by the survey respondent. Workshop attendees discussed both direct personal financial impacts and the river's role in the bigger picture of Tucson's economy, including its appeal to businesses and professionals:

It was generally agreed that most survey respondents may not live near enough to the river or work in an industry that would gain financial benefit directly. Those that do receive personal direct benefit may not realize or understand the extent. Some attendees mentioned that the river may be detrimental if it's considered unsafe, dirty, a flood risk, or if it's attracting people to the neighborhood reducing privacy.

Public understanding of the connection between the river and the local economy has a significant role in perception of financial value. Desert rivers may be perceived to have lower scenic value compared to other areas in the country, and out-of-towners or "snowbirds" may not have an accurate expectation or appreciation of a healthy river in the arid southwest. There was a mixed perception of how the river could be elevated in the public eye. The proposal to divert water to downtown was occasionally brought up by a handful of attendees with mixed approval. San Antonio was often cited as a river-centric economic development approach which may not be a match for Tucson. Related to the diversion, there was concern about losing the environmental benefits in this reach particularly if those are benefiting recreational industry, attracting tourists or providing ecosystem services. Birding tours, bike shops on the Loop, and other recreational tourism was frequently brought up as a contributor to the regional economy.

River Values - Observations

Overall

- There was consensus among the workshop attendees that they support the work we're doing to create an engaged community.
- The river's role in providing open space and water security scored the highest by most groups.
- Personal financial benefit was ranked very low. This was likely attributed to the wording of the question. The survey asked if they felt a direct benefit which didn't capture the bigger picture benefits of regional tourism or ecosystem services.
- Further research of public perception and an objective analysis of the financial benefits derived from the Santa Cruz River are recommended.
- The remaining values received similar scores to one another. These values are difficult to rank and the exact order of these values is unknown. Selecting different methods of analysis produce slightly different prioritization of mid-ranking values, so any attempt to arrange the mid-ranking values among themselves could be challenged.

By User Group

- Open space ranked highly among all user groups.
- Birders and horseback riders were the user groups that felt the strongest about environmental resiliency.
- Bike riders, birders, and horseback riders typically scored above average in all categories, possibly indicating they are the primary recreational stakeholder groups. The “other – write in” users recorded below average value scores in most categories.
- All user group categories averaged a very low or negative score (indicating disagreement) toward the financial values. The highest scoring group in this area were the Horseback riders.
- Commuting was most valued by the bike rider group.

By River Reach

- In each river reach, open space and the river’s role in our water supply continue to be first and second values.
- The third most important value varied among each reach, indicating some unique values based on location.
 - Flood safety is the third most important value in Marana Flats. Elsewhere in Pima County, flood safety rated in the middle across most geographies in Pima County.
 - For Cortaro Narrows residences, commuting and exercise as well as flood safety are ranked third.
 - Residents in the Three Rivers reach have the rivers role in cultural heritage and environmental sustainability tied for third.
- Financial benefit scored neutral- to -low throughout all geographies. It is of most value to residents in the Cortaro Narrows reach, but it's still very low score.

Topic 3: Management Preferences

Resource managers often have variety of approaches they can use to achieve their mandated goals and objectives. Knowledge of which management objectives would be most-supported by community members can help identify multi-beneficial management approaches. For example, would the community prefer that a restoration project occur where it will best support recreation or the most wildlife habitat?

Survey respondents were presented with various management objectives. Careful attention was given to this section to ensure the results would be relevant to current discussions about river management. Collaborating resource managers suggested the management objectives described in this section from what they see as commonly discussed management goals and concerns. Table 8 lists the full statements used in the survey questions. Respondents were asked to provide relative prioritization by assigning high, medium, low priority values. They were also able to indicate the top priority or whether something should not be a resource management objective. The order in which these statements were presented was randomized between each survey to minimize possible order effect.

To make clear comparisons across statements, the data were streamlined into an average. Each response type was assigned a multiplying factor that would give an appropriate weight to that response. The following process for calculating the average score was used for each management objective category: step 1) multiply the frequency of that response by the assigned multiplier in table 7; step 2) sum the products of step 1; step 3) divide by the number of people who responded to that specific management objective category to get the final average. This last detail was critical as some people skipped some management responses, so always dividing by the total number of survey responses would have skewed the results.

Response	Multiplier
Should NOT be an objective	1
Low priority	2
Medium priority	3
High priority	4
Top priority (please indicate one)	5

Table 7 – Management preferences analysis multipliers

Please prioritize the following hypothetical management objectives for the river and which one, if any, stands out as a top priority.
• Habitat: Manage flowing sections to maximize benefit for plants and animal habitat.
• Water Supply: Manage for the most recharge of our groundwater and the amount of water available for future use by cities.
• Tributaries: Increase water harvesting and habitat restoration in upstream neighborhood washes.
• Recreation: Enhance recreational aspects, such as parks, community events, and facilities.
• Flood Safety: Reduce risk of flooding and protect human safety.
• Sustainability: Address climate change in management decision-making.
• Pests: Minimize the presence of nuisance species such as mosquitoes.
• Expense: Manage flowing sections in a cost effective way.
• Minimal Management: Let the river flow naturally, i.e. don't manage the river any more than you have to.
• Water Visibility: Direct the flow so that water and vegetation may be seen from many high-use areas.

Table 8 – Full statements respondents read about management preferences for the river

Management Objectives Survey Results – All Survey Responses

Figure 10 illustrates the final scores, and all survey responses are shown in figure 11.

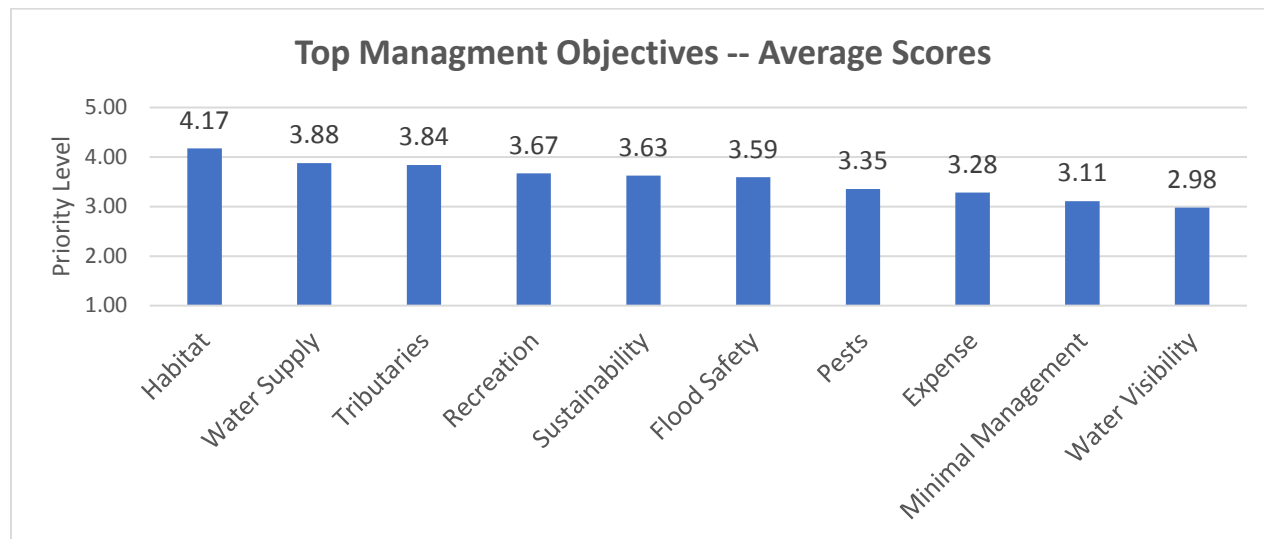


Figure 10 – Average scores of management preferences, all responses (n=510)

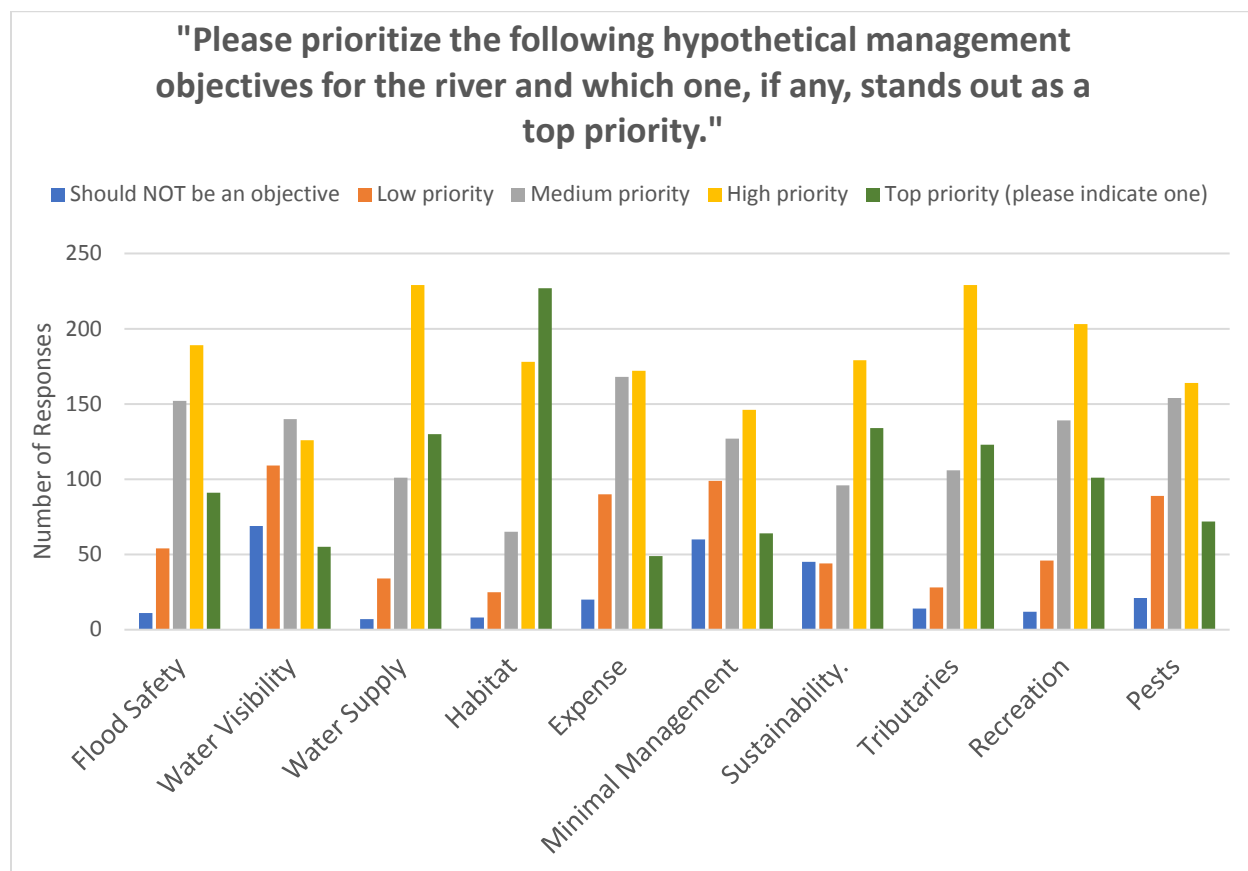


Figure 11 – Management preferences as reported in the survey, all responses (n=510)

Community Values and Management Preferences

Management Objectives Survey Results – by User Group

Survey results were analyzed by the self-described user group (Figure 12). Table 9 lists the sample sizes for each user group. For the complete survey results organized by user groups, please see Appendix C.

User Group Sample Sizes				
User of Riverside Parks / Playgrounds	N = 42		Environmental Advocate	N = 91
"Other" User	N = 23		Horseback Rider	N = 8
Runner / Walker	N = 58		Hunter / Fisherman	N = 17
Resource Manager	N = 11		Bike Rider	N = 110
Neighbor / Passive Appreciator	N = 81		Birder	N = 59

Table 9 – Survey respondent sample size by user group

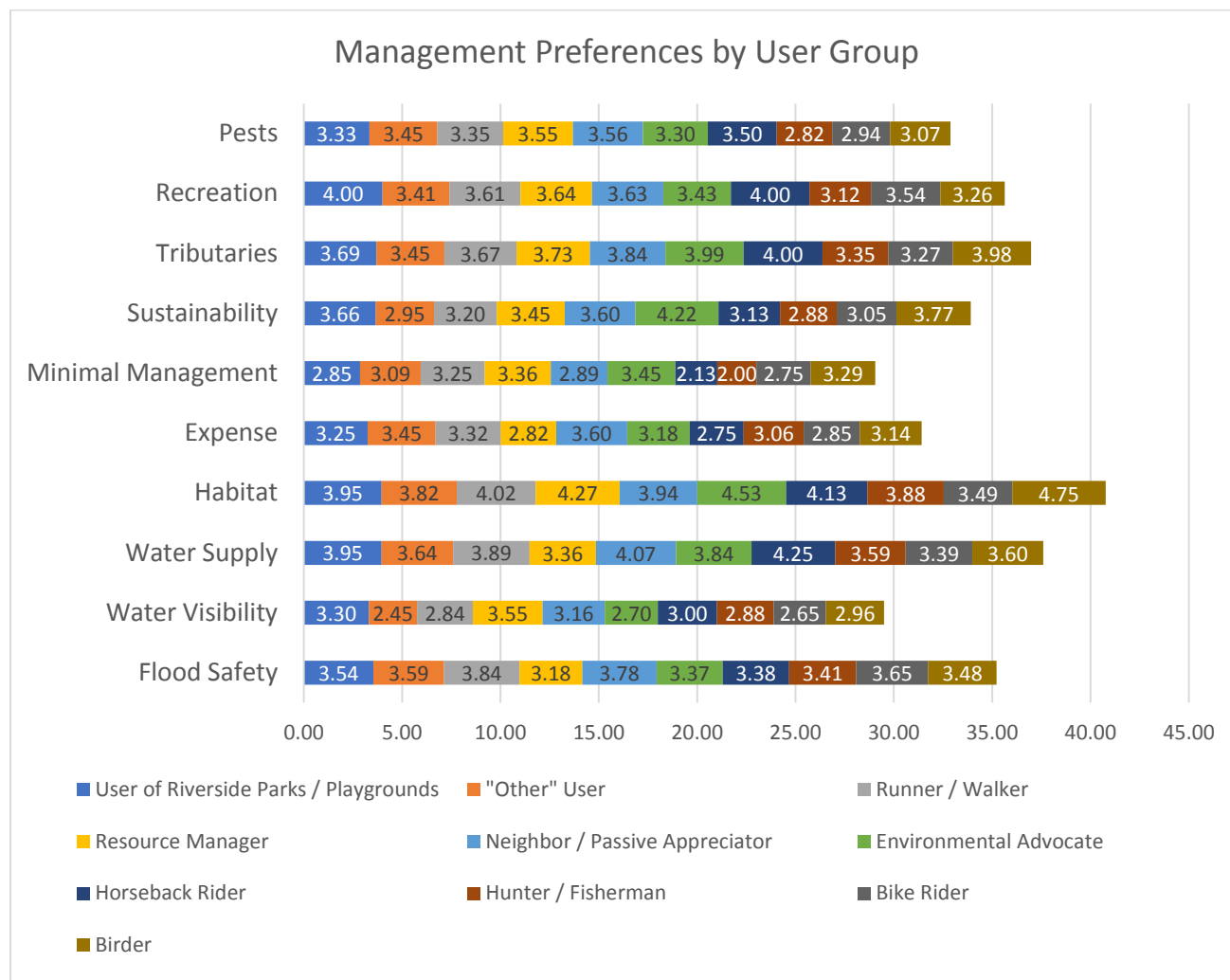


Figure 12 – Management preferences of all user groups

Management Objectives Survey Results – by Geography

Survey results were analyzed for place-based trends using zip codes. Survey responses were grouped into approximate geographies and commonly used regions, according to the zip code. This section reports data from only the three reaches associated with the following section of the river. See table 10 for which zip codes were considered within each reach. For more results organized by Zip Code / Approximate reach, see Appendix C.

Project Area Reaches	Zip Codes		
Three Rivers (n=129)	85741*	85705	85745
Cortaro Narrows (n=68)	85741*	85742	85743
Marana Flats (n=18)	85653	85658	
*Due to considerable spatial overlap, 85741 was averaged into two reaches.			

Table 10 – River Reaches and Zip Codes

	Habitat	Water Supply	Tributaries	Recreation	Flood Safety	Sustainability	Expense	Pests	Water Visibility	Minimal Management
Three Rivers Reach (n=129)	4.25	4.04	3.98	3.76	3.62	3.88	3.36	3.36	3.19	3.19
Cortaro Narrows (n=68)	3.96	3.65	3.54	3.74	3.76	3.20	3.41	3.30	3.04	3.10
Marana Flats (n=18)	3.67	3.78	3.50	3.78	3.89	2.50	3.28	3.56	2.94	2.72
Project Area (n=215)	4.11	3.90	3.80	3.76	3.69	3.55	3.37	3.35	3.12	3.12

Table 11 – Average values of each river reach

Community Values and Management Preferences

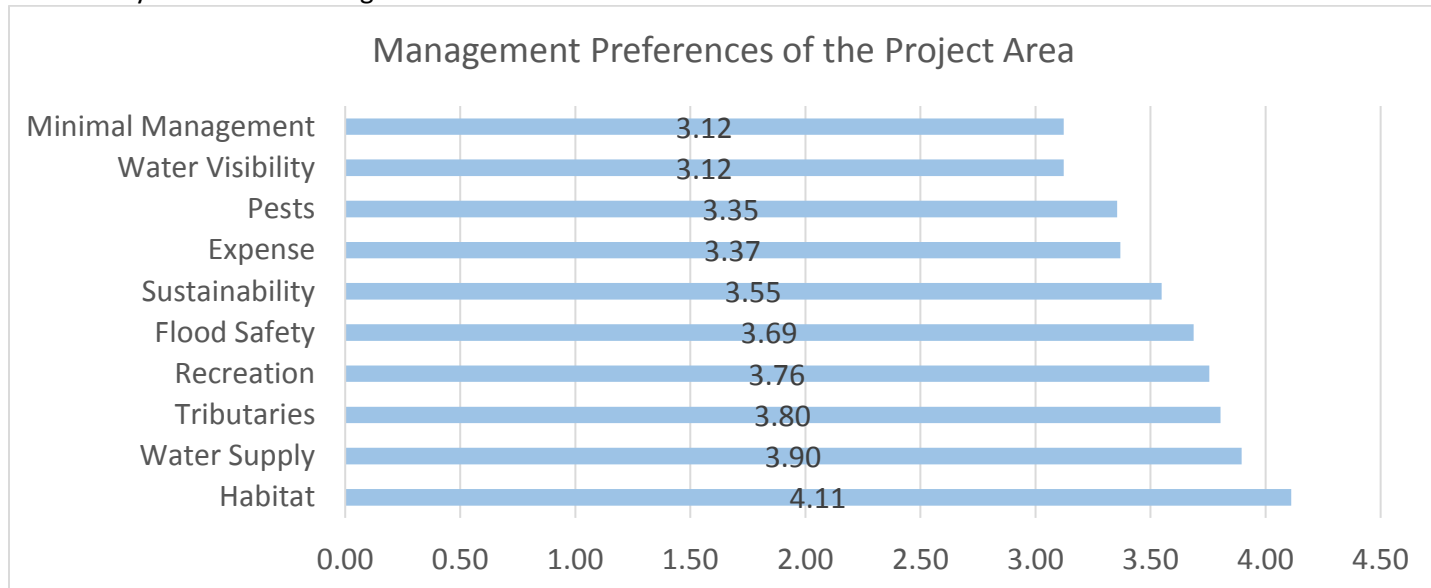


Figure 13a – Management Preferences in the Project Area (n=215)

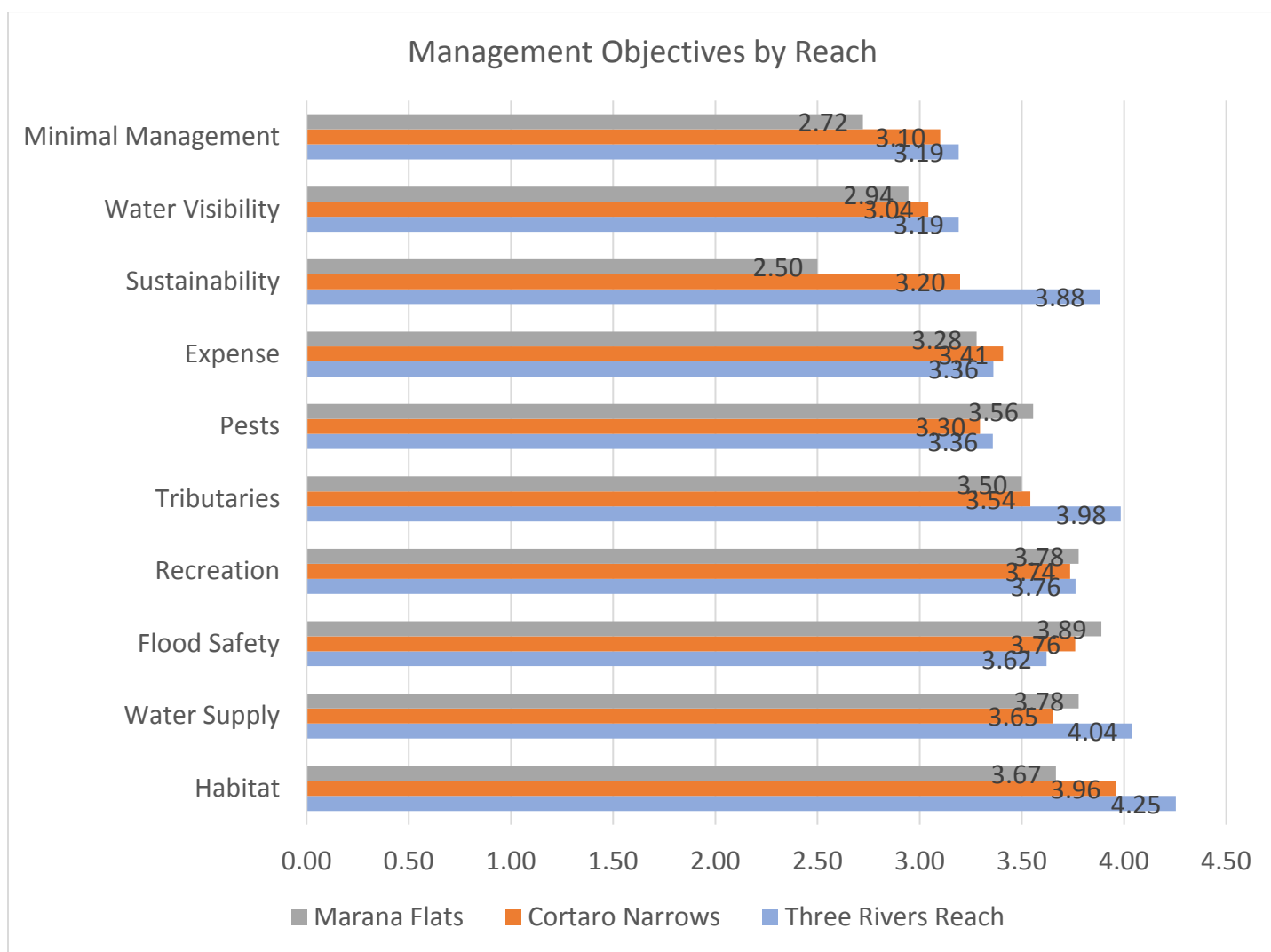


Figure 13b – Management preferences by reach

Takeaways from workshop discussions on management objectives:

During the workshops, attendees reviewed the preliminary results and discussed overall impressions and interpretation of the questions, evaluated unexpected results, and voiced additional concerns that need to be addressed. They were specifically asked for their input on what “maximized benefit for habitat” would look like, and the low score of water visibility. The following are the overall results of the workshop discussions. For specific notes related to each reach, and the general comments from the Management Objectives question of the survey, please see Appendix B – Additional Discussion.

Workshop attendees were made aware of Pima County Regional Flood Control District’s intentions to use the information from this community engagement effort in the development of a management plan for the river. Pima County RFCD staff were present for this discussion to hear the results first-hand and answer any specific questions.

Water Visibility

This topic requires further investigation. Small group discussion and inconsistent results between sections of this report revealed that the wording of the question was ambiguous. This question was intended to discuss whether water visibility was important to have in high-use areas for recreation on the loop trail and surrounding communities. It was ranked as a low priority in the survey, but interactive map data (see next topic) shows it as the main factor of what attracts recreators to specific sites.

Workshop attendees said the phrase “high use” was occasionally interpreted as increasing housing and development. Increased housing density tends to be viewed unfavorably, so that interpretation may have negatively influenced the results.

However, after explaining the intent of the question to workshop attendees, further discussion did show some mixed perspectives on the value of water visibility. Water visibility is linked with recreational enjoyment. However, as one local said, “this is the desert; we don’t typically expect see the water,” implying while it’s beneficial it isn’t a priority. .

Flood Safety

This was the only subject area that revealed significantly conflicting views among the different reaches. The Avra Valley – Trico Road workshop attendees were concerned that flood safety should be the primary objective. Other workshops did not mention flood safety as a concern. Flood control infrastructure was occasionally mentioned as a hindrance of the natural environment.

Habitat

There was general agreement across the workshops that “maximizing benefit to habitat” would include maintaining wildlife linkages, naturally vegetated banks and trash removal. Most attendees were focused on bird habitat. However, a few residents from Marana were particularly wary of habitat restoration that would exacerbate flood impacts.

River Management Preferences – Observations

Overall:

- Place-based data analysis and workshop discussions show there are different “personalities” and needs within each area of the river.
- The mid-ranking management objectives are difficult to arrange in order to prioritize. Different methods of data analysis will produce slightly different results. However, there are some clear groupings in the overall trends:
 1. Managing for the maximum benefit of habitat
 2. Groundwater Recharge and Increasing recharge in tributaries
 3. Supporting recreation, addressing sustainability, and maintaining flood safety
 4. Pests, cost, and minimal influence
 5. Water visibility from high use areas
- Between Avra Valley and Trico Road, residents were primarily concerned with increasing flood safety and slowing the flow during monsoon events.
- The Cortaro and Flowing Wells workshop discussions determined that “maximum benefit for habitat” should focus on bird habitat and a reduced presence of flood control structures. Bank protection were often described as a barrier to the highly valued “naturalness” of the river.
- The term “high-use areas” in Water Visibility was misinterpreted to imply increased housing and development, although the intention was for recreational areas. Whether water is visible from recreational areas could be a discussion point for future community engagement efforts with the Pima County Regional Flood Control District management plan.

By user group:

- Habitat scored high with every user group. It was almost unanimously top priority among birders.
- In contrast to the overall results –
 - Reducing expense and pest control rated the highest with neighbors/passive appreciators group.
 - Water visibility scored the highest with resource managers, perhaps because they were more familiar with the intent of the question.
 - Minimal management scored below average for every group except resource managers and environmental advocates.
- Hunter/fishermen scored below average on all but habitat and water security.
- Horseback riders averaged very high scores across multiple management objectives.

By geography:

- Habitat was still the biggest concern for all three reaches.
- Flood safety moved up to the second priority for Marana Flats residents and Cortaro Narrows residents. Water Supply and Recreation are closely tied for third in each region.
- Three Rivers residents ranked upstream water harvesting as third priority.
- Marana Flats respondents showed the least concern about environmental stability.

Topic 4: Where and How the River is Used

It's important to understand patterns of recreational use of the river. Popular areas can help resource managers can be used by resource managers to identify opportunities for capital improvement, public education, community events, and more. Understanding what makes popular areas attractive can give some idea of what kind of improvement might be made to increase enjoyment in additional areas of the river. Seeking suggestions for improvements can help prioritize investments in the river corridor.

As part of conducting this community outreach project, Sonoran Institute produced an interactive map of the Santa Cruz River. Users were asked to mark locations on the map and to answer questions on how that spot is used, what is valued about that location, and what needs to be changed.

The figures and table on pages 26-43 show the overall results of most used, areas where the most improvements may be needed, and the areas that are liked for the most reasons. For more maps and additional details please see Appendix D and E.

Where and How the River is Used Observations-

- Areas that could be improved often coincide with high use recreational areas.
- The Santa Cruz River mainstem is not as “well-liked” as the Rillito but this dataset does not give a clear explanation as to why. Since the outreach efforts were focused on the mainstem between Grant and Trico Road, further research about other areas would be required to make qualitative comparisons outside of the Grant to Trico Road area.
- Water Visibility scored relatively high for all types of river users as a reason why they chose that spot, further supporting the notion that the online survey question was poorly written. However, the natural features were often a greater draw, so the trees and wildlife that water supports may be more important than the water itself.
- Tourists are brought to places that are conveniently located and have visible water and natural features.
- Convenience is very important for tourism, park use and foot-traffic recreational users.
- Amenities are most important to park users.
- A return to “wildness” was the most frequently cited improvement, including among park users, which supports the high scores for natural open space as a value and a management preference.

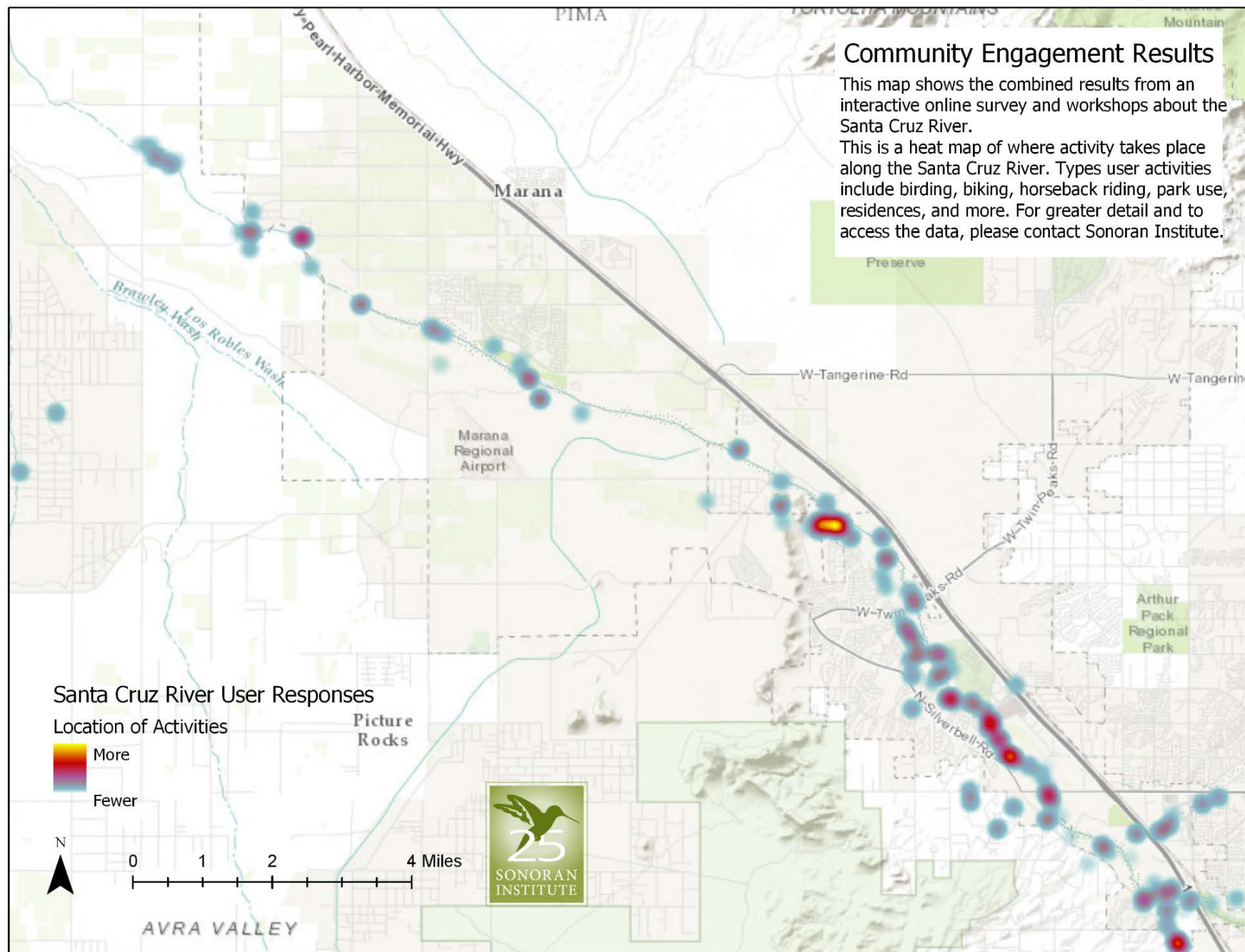


Figure 14a – Location of all activities (downstream portion of study area)

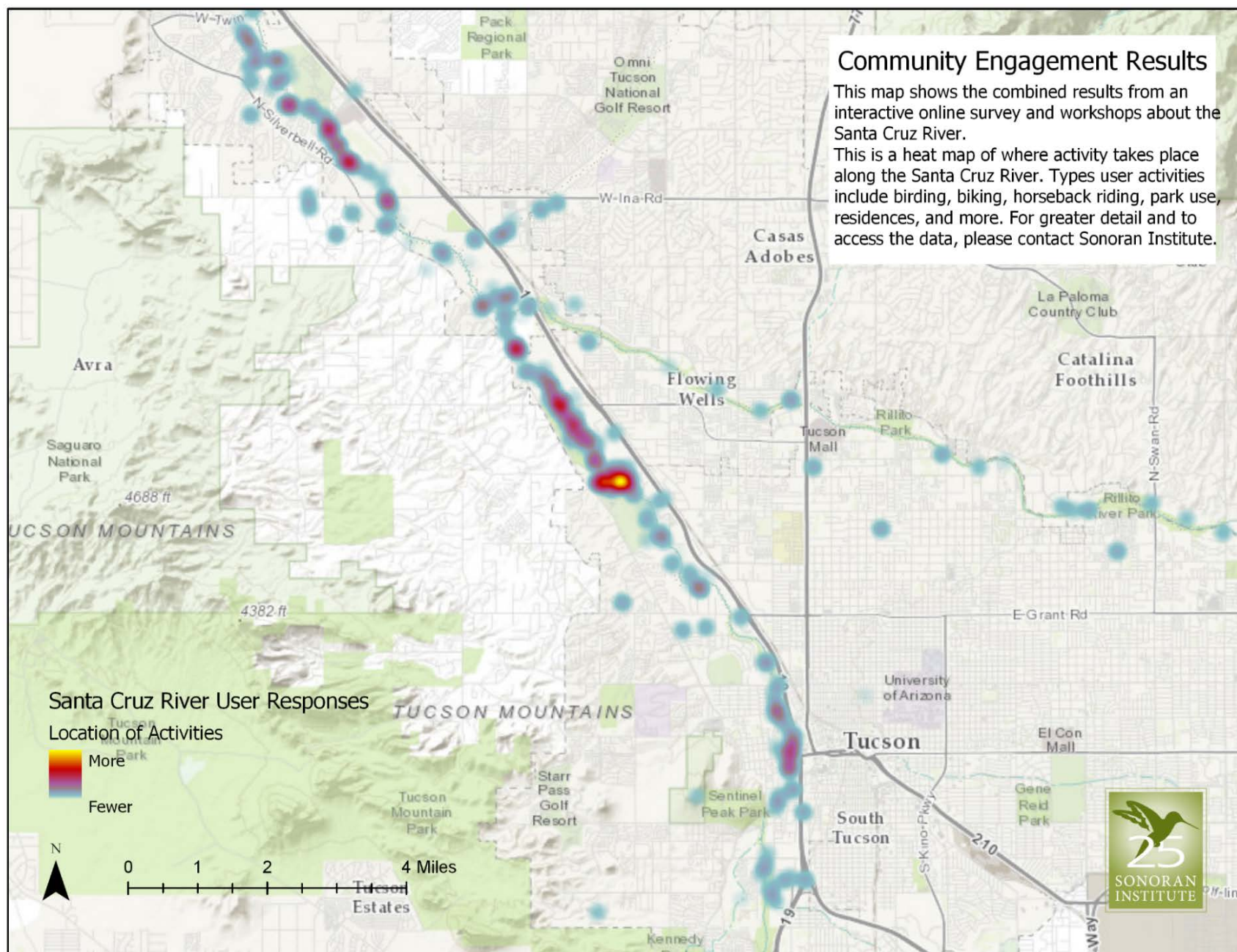


Figure 14b – Location of all activities (upstream portion of study area)

Community Values and Management Preferences

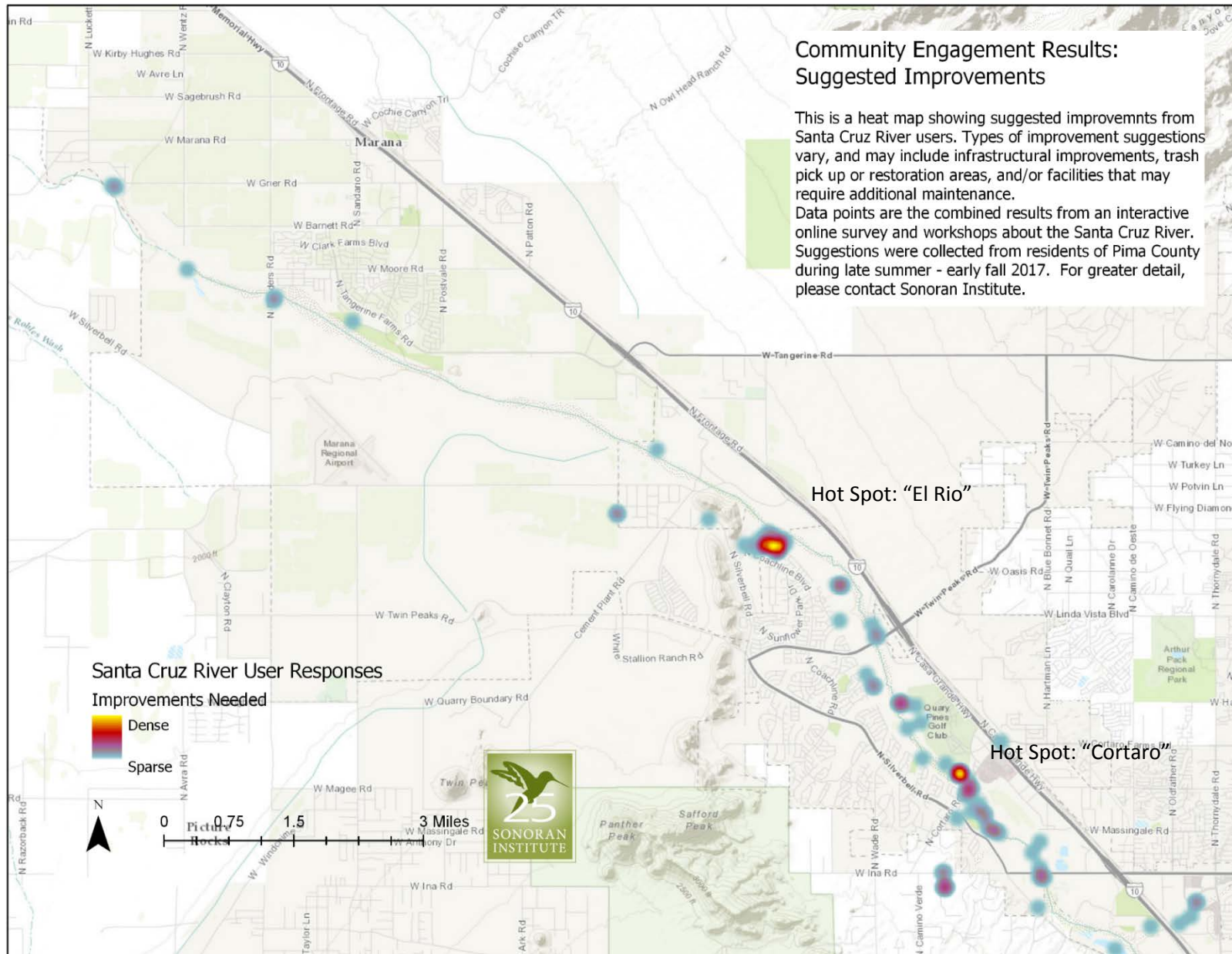


Figure 15a – Location of suggested improvements (downstream portion of study area)

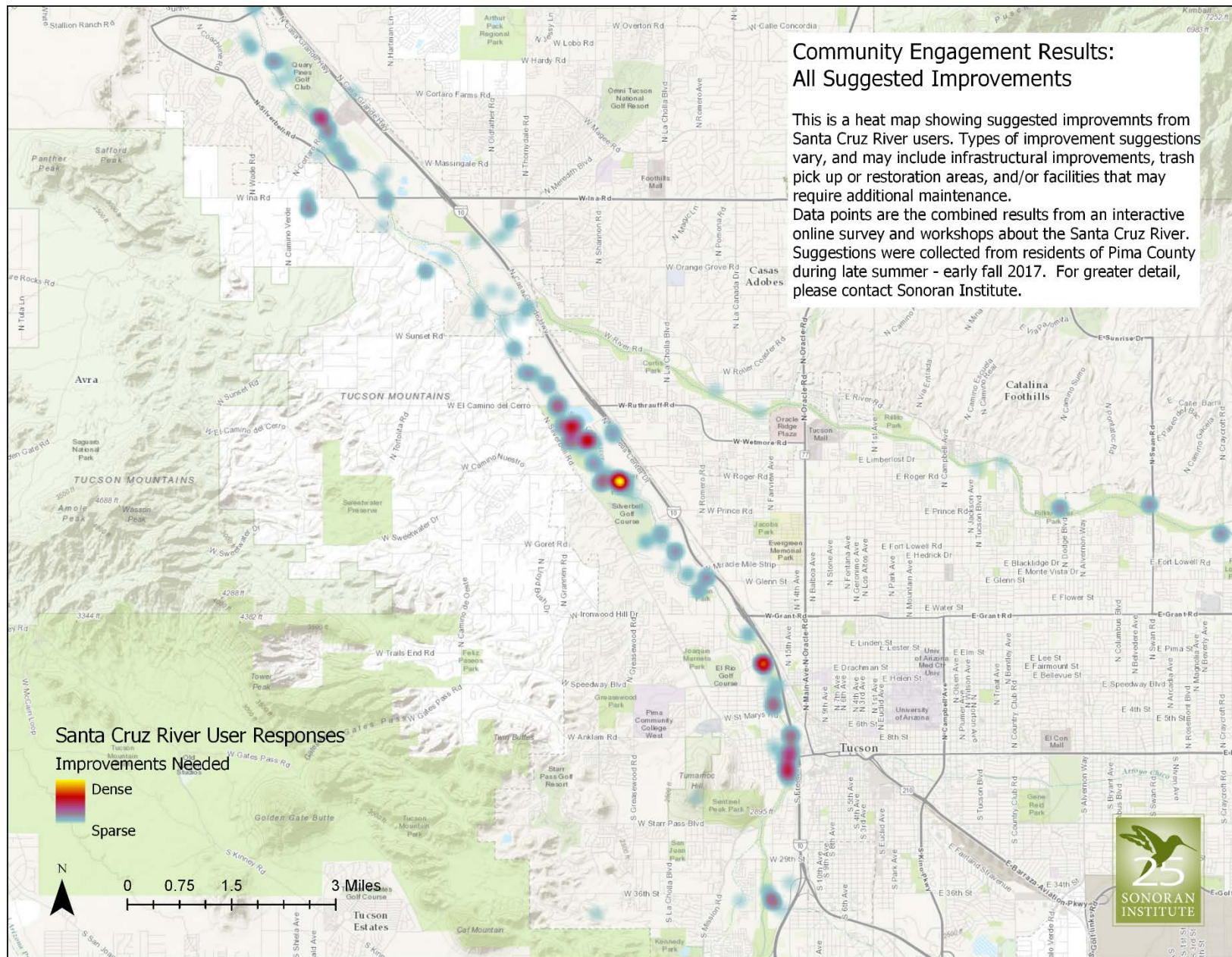


Figure 15b – Location of suggested improvements (upstream portion of study area)

Community Values and Management Preferences

Table 11: Survey responses associated with mapped locations, grouped by “hot spot” of activity along the river. Key to letters in Appendix D.

Hot Spot	What do you do at this location?	How often do you visit here?	How satisfied are you?	Why do you choose to visit this place?	What are your concerns?	Suggested Improvements?	Comments:
El Rio	Other	B	D	E		I	El Rio Preserve will be a great community and ecological asset and would really benefit from the support of organizations such as the Sonoran Institute
	Birding	C	B	E	Compromising habitat	I	
	Birding	A	B	A, B, C, D, E, F, G, H	getting silted in by repeated floods	B	
	Birding						
	Birding	B	B	B, E, F, G		B	
	Other	C	B	ABCE	Closed to boats		
	Birding						
	Birding	A	B	A, B, C, E, F	I worry that it dries up and that uninformed users use the area in a way that scares wildlife away.	B, F, I, plus some wildlife viewing areas, possibly even a small birding tower. Plus, water managed for different types of birds (swimmers vs. waders).	
	Birding, Walking, Tourism, Other	B	E	A, E	Need bank protection to reduce flooding, trash, weeds; no bathroom at parking lot	D	
	Other - Design	C	D		proper balance between ecological rehabilitation and recreation, community ownership; needs improvement -- trash, mosquitoes, flooding, smell and trails		more community engagement to build ownership of space and funding that is needed for rehabilitation efforts

Survey responses associated with mapped locations, grouped by “hot spot” of activity along the river, Key to letters in Appendix D. *continued*

Hot Spot	What do you do at this location?	How often do you visit here?	How satisfied are you?	Why do you choose to visit this place?	What are your concerns?	Suggested Improvements?	Comments:
El Rio	Bike Riding	A	B	C, H		I	a loop around the water so I can see it all as I bike around it
	Birding, Running, Tourists	A	A	A, D, E, H, I		I	very nice historical interpretive sign
	Birding, Running / Walking, Bike Riding	A	B	A, B, E, G	Trash is starting to be a problem, homeless camps on occasion	B, C	Dog park by PACC area, "adopt a mile" or stretch of the river, get local/group ownership
	Bike Riding	B		A, B, D, E, F, G		B	
	Running / Walking	A	A	A, C, E, G, H, I	Dogs off leash	Better signage for dogs on leash, more poop stations, better signage about respecting wildlife	
	Bike Riding						
Cortaro	Birding	B	A	B		F	
	Park Use (such as picnicking, playgrounds, etc)	B	A	A, D, I		A	
	Park Use (such as picnicking, playgrounds, etc)	B		A, D, H		E	Dog Park needs more shade trees
	Park Use (such as picnicking, playgrounds, etc)						
	Birding	C	B	E, A		I	
	Park Use (such as picnicking, playgrounds, etc)	D	A	C, D, E			

Community Values and Management Preferences

Survey responses associated with mapped locations, grouped by “hot spot” of activity along the river. Key to letters in Appendix D. *continued*

Hot Spot	What do you do at this location?	How often do you visit here?	How satisfied are you?	Why do you choose to visit this place?	What are your concerns?	Suggested Improvements?	Comments:
Cortaro	Birding	B	B	A, B, D, E		G, I	
	Birding	C	B	E		A	
	Birding	A	A	A, B, E, H, I	Invasive plants	More benches within view of the water. The current bench(es) are set back too far from the edge of the bank.	
	Bike Riding	A	A	A, H		A	
	Birding, Walking, Tourism, Bike Riding	A	A	A, C, E		H	
	Birding, Walking, Park Use, Other			B, E, C, H	Concerned water will be removed upstream and willows/natural veg will dry and be reduced	I	Leave water running through here
	Running, Park Use, Bike Riding	C	A	B, D, C, H	Want it to remain the same, no more development on east side	C, F	
	Bike Riding	A	B	A, C, E	river path has large stress cracks than can blow out bike tires, needs maintenance	D	
	Birding	A			Garbage in river		More garbage cans along the path
	Bike Riding	B	B	A	Homeless people	D	Dog poo a problem
Christopher Columbus Park	Bike Riding	C	A	A, B, C, E, F, I	Have to be extra cautious on parts of the loop, especially south of Ruthrauff and a few odd people	H, I	Likes other: connectivity of trails Imp other: would be nice to have some remote camera surveillance for safety

Survey responses associated with mapped locations, grouped by “hot spot” of activity along the river. Key to letters in Appendix D. *continued*

Hot Spot	What do you do at this location?	How often do you visit here?	How satisfied are you?	Why do you choose to visit this place?	What are your concerns?	Suggested Improvements?	Comments:
Christopher Columbus Park	Bike Riding	A	A	A, D, H			
	Bike Riding						
	Bike Riding	C	A	D	none	A	none
	Birding	D	B	A, B, C, E, F		I	
	Birding	C	D	E, G	Future bank protection	Make Christopher Columbus Park a place where at least part of the park can be flooded and absorb floodwater, rather than making it a place that has to be protected by bank protection. Habitat restoration is in the master plan for the park.	
	Birding	C	B	E	That the water keeps flowing	H	Remove invasives and plant natives
	Birding, Bike Riding	C	C	E, F			
	Birding, Running, Nature Study	D	B	E	It's not looked after to preserve and restore its natural values; Needs habitat restoration	H	too much trash and channelized areas are not attractive; restore the native vegetation
	Birding, Running / Walking, Bike Riding	A	B	A, B, E, G	Trash is starting to be a problem, homeless camps on occasion	B, C	Dog park by PACC area, "adopt a mile" or stretch of the river, get local/group ownership
	Other	C	B	good riparian forest and sandy floodplain	continuing encroachment on floodplain natural open space (threat)	acquire lands to ensure / increase natural river park space	
	Other	A	D	I		I	Activity: Transportation; Improvements: Have auto drivers appreciate beauty of river

Survey responses associated with mapped locations, grouped by “hot spot” of activity along the river. Key to letters in Appendix D. *continued*

Hot Spot	What do you do at this location?	How often do you visit here?	How satisfied are you?	Why do you choose to visit this place?	What are your concerns?	Suggested Improvements?	Comments:
Christopher Columbus Park	Park Use (such as picnicking, playgrounds, etc)	C	A	A, B, C, D, E, I		F, G	
	Park Use (such as picnicking, playgrounds, etc)	C	D	A, B, D, F	water is awful in pond / lake - color added, noise from remote planes	C, I	Wish it was more natural and blended into the desert more - tree are nice but more native trees would be better
	Park Use (such as picnicking, playgrounds, etc)	B	B	A, E, I	"Christopher Columbus" is a terrible namesake for this park	Native plant species added to park itself	
	Running / Walking	C	C	A, B, C	safety	B, I	I like the path here
	Running / Walking	D	A	C	Will it continue to be so attractive, with the greenery?	D	NA
	Running / Walking	A	A	A, C, E	There is a lot of trash in the river and along the banks	B, F	
	Running / Walking	B	B	A, B, G, would like amenities for dog walking and access into the river environment with a dog friendly loop trail.	Safety at dusk	C, D, E,	This could be a much more robust park, it already has the dog park and the lake and kid elements, but it could be a nature trail and connect to the river. I would use this much more if there were trails that felt safe for walking. I would love it if there were a dog area on the far part of the lake that allowed for dog swimming. Many other communities have this and it would be an excellent draw. Nature trails connecting to the river would be a perfect complement to this.

Survey responses associated with mapped locations, grouped by “hot spot” of activity along the river. Key to letters in Appendix D. *continued*

Hotspot	What do you do at this location?	How often do you visit here?	How satisfied are you?	Why do you choose to visit this place?	What are your concerns?	Suggested Improvements?	Comments:
Sweetwater Wetlands	Birding						
	Birding	C	A	A, C, D, E, G, I			
	Birding	C	C	A, B, C, E, F, G	Safety	A	Great Park!
	Birding			E			
	Neighbor/ Passive Appreciator	C	A	C, E, G, H, I	mosquitoes?		
	Birding	D	A	A, B, C, E, F, G, H, I	mosquito and invasives control		
	Birding	C	A	C, E		I	
	Birding	B	B	E--highest bird diversity in greater Tucson area	Tucson Water budget concerns could threaten its existence some day	I--enhance diversity of habitat	
	Birding	B	B	F	crime	A	heavily trimmed and swept - would prefer if left wilder
	Birding	E	E	E	closed!	C	
	Birding	C	C	C	Hard to see in	G	better viewing
	Birding	C	A	A, B, C, D, E, F, G, H, I	Always keep it open	A	The Sweetwater Wetlands is a Tucson jewel.
	Birding			E G			
	Birding	C	A	C, E, G, H, I			
	Birding	C	B	G			
	Birding						
	Birding				Low water. Loss of habitat		
	Birding				Loss of habitat		
	Birding						

Community Values and Management Preferences

Survey responses associated with mapped locations, grouped by “hot spot” of activity along the river. Key to letters in Appendix D. *continued*

Hot Spot	What do you do at this location?	How often do you visit here?	How satisfied are you?	Why do you choose to visit this place?	What are your concerns?	Suggested Improvements?	Comments:
Sweetwater Wetlands	Birding	C	A	A, B, C, D, E, F, G, H, I		Bike lockers to make riding here and locking up a bike more secure.	
	Birding			it is close to the washes I access from my old neighborhood. I like the remoteness since I bring my dogs and they like to run off leash where they won't interfere with other people.			
	Birding		B	A, E, F	Local urbanization	I	
	Birding	C	B	A, C, E, G, H	water flow has changed		
	Birding			A, D, E, G			
	Birding	B	A	A, B, E, F, G, H, I	That the City would chose to close it down.	C	
	Other		A	E			
	Birding			E			
	Birding	D	B	D, E	That it be kept open	A	no improvements necessary if water is provided in the wetlands
	Birding, Bring tourists here	C	A	A, B, C, E, F, H, I	With closure of Sweetwater wetland ponds, no longer have water so wildlife and birds less concentrated in the area	D, H	Likes other: drawing, painting, photography; Improvements: shade structures and more comfortable benches in various locations

Survey responses associated with mapped locations, grouped by “hot spot” of activity along the river. Key to letters in Appendix D. *continued*

Hot Spot	What do you do at this location?	How often do you visit here?	How satisfied are you?	Why do you choose to visit this place?	What are your concerns?	Suggested Improvements?	Comments:
Sweetwater Wetlands	Birding	C	A	E	Vehicle break-ins in parking lot	A	
	Birding, Running / Walking, Bike Riding	A	B	A, B, E, G	Trash is starting to be a problem, homeless camps on occasion	B, C	Dog park by PACC area, "adopt a mile" or stretch of the river, get local/group ownership
	Birding	C	B	E	Loss of habitat		
	Birding, Bike Riding	C	C	E, F			
	Running / Walking	C	B	A, B, G I like that there is a dog park but think the amenities could be much improved on the river side of the lake.	safety at dusk, no good trails down to the river.	D, E, F, G; I would like to see a dog swimming park on the east side of the lake. I would also love it if there were trails down to the river and signage to teach about the ecology.	I think this could be a much more robust park that integrates natural areas and brings kids and people with dogs to the unique area. - I go to the dog park, but would really use it a lot more if there were trails and more to do with my dog (swim park!!!)
	Other						
Grant	Neighbor/ Passive Appreciator						
	Other	B	D	A, B, E, F	Poor vegetation management	increased native vegetation	
	Other	B					
	Bike Riding	C	B	To get downtown		Where bike trail turns into stairs, crossing the freeway to downtown safely	
	Running / Walking						

Community Values and Management Preferences

Survey responses associated with mapped locations, grouped by “hot spot” of activity along the river. Key to letters in Appendix D. *continued*

Hot Spot	What do you do at this location?	How often do you visit here?	How satisfied are you?	Why do you choose to visit this place?	What are your concerns?	Suggested Improvements?	Comments:
Congress	Park Use (such as picnicking, playgrounds, etc)				Dog park is good and when I used to take my kids to the park, it was good. Not as much for me at the lake now that my kids have grown up.		
	Neighbor/ Passive Appreciator	D		A, B, G	art features in this area	A	
	Birding	C	A	E			
	Neighbor/ Passive Appreciator	C	A	A, E			
	Neighbor/ Passive Appreciator	A	B	A, B, F, H, I		G, H, I	
	Other	B		A, D, H, I		E, I	
	Neighbor/ Passive Appreciator			A		B, I	
	Neighbor/ Passive Appreciator	B	D	A	Lack of natural feel	B, I	grateful for alternative transportation routes here, but wish it had the nice natural feel of other areas
	Neighbor/ Passive Appreciator	C	D	A, C, D	Homeless, transient population use	B, D, E, F, I	
	Park Use (such as picnicking, playgrounds, etc)	C	B	A, B, C	public safety	B	

Survey responses associated with mapped locations, grouped by “hot spot” of activity along the river. Key to letters in Appendix D. *continued*

Hot Spot	What do you do at this location?	How often do you visit here?	How satisfied are you?	Why do you choose to visit this place?	What are your concerns?	Suggested Improvements?	Comments:
Congress	Other	C		A, B	management for natural open space features is weak, under Rio Nuevo direction especially.	The area is important for connectivity and for its great public and cultural accessibility. Recognizing this would change management.	
	Bike Riding	A	A	A, E, beautiful way to commute	none	A	
	Bike Riding						
	Bike Riding	B	D	A	lack of natural feel	B, I	Wish this had more water flow, flora/fauna although the grateful for the bike path
	Running / Walking	C	B	A, E, G, H		B, C	
	Running / Walking	B	B	close to work and downtown		more native trees	
	Bike Riding	C	D	A	Safety concerns from other people on the path, especially at low use times. My family was directly involved in an assault situation at the Cushing St bridge while bike riding.	More public safety officers present	
	Running / Walking	C	D	A, E	Security, sadly no water yet downtown.	I, plus security cameras. Bring the flow downtown.	Make the river downtown a destination by bringing the flow downtown.
	Running / Walking	C		A, B, C, D, E		D, E, I	
	Bike Riding						
	Bike Riding					C	

Community Values and Management Preferences

Survey responses associated with mapped locations, grouped by “hot spot” of activity along the river. Key to letters in Appendix D. *continued*

Hot Spot	What do you do at this location?	How often do you visit here?	How satisfied are you?	Why do you choose to visit this place?	What are your concerns?	Suggested Improvements?	Comments:
Paseo de las Iglesias	Birding	A	B	natural features	buffelgrass	keep circle pond with water year-round	more native grass seeding/planting
	Running / Walking	B	A	A		A	
	Bike Riding	B		A, B, D, E, G	Slightly sketch sometimes	The sketchiness almost improves it though	
	Running / Walking	A	B	A, E, G		B	
	Bike Riding						
	Bike Riding						
	Bike Riding						
	Running / Walking	B	C				
	Running / Walking	A	B	location and vistas	Trash comping from Julian wash and neighborhood east of river and south of Silverlake. Buffelgrass	Trash Clean Up, buffelgrass eradication	
	Running / Walking						

Table 11: Participant Responses per Hot Spot (Data selection – for complete data set please contact Sonoran Institute)

“What are the main reasons why you choose to spend time here? (multiple choice)”									
	Convenient location	Easy access to the river from parking	Water is visible from here	Has enough amenities	Has natural features	Popular with those with my interests	Quiet	Safe	Clean
Other (n=34)	26%	21%	18%	15%	35%	9%	9%	12%	12%
Fishing (n=11)	0%	0%	0%	0%	9%	9%	36%	0%	0%
Tourism (n=6)	100%	17%	50%	17%	83%	17%	33%	33%	33%
Park Use (n=11)	82%	64%	55%	64%	45%	18%	18%	45%	45%
Birding (n=103)	27%	19%	24%	10%	66%	19%	25%	12%	11%
Horseback Riding (n=36)	11%	11%	22%	11%	67%	22%	11%	11%	22%
Bike Riding (n=128)	38%	12%	17%	11%	36%	17%	13%	13%	8%
Running/ Walking (N=44)	64%	30%	32%	14%	55%	11%	45%	30%	16%

Table 12 – Reasons why users chose to visit a given location

Community Values and Management Preferences

What are your ideas to improve this location? (Select from our examples, or enter your own:)										
	No changes are necessary	Increased maintenance of existing amenities	"Small" amenities (trash can, bike rack, bench, picnic table, pet waste bags, other)	"Large" amenities (drinking fountain, parking, shade structure, improved access to the river, other)	Information (Educational display, directional signs, other)	Community enhancements (a bulletin board, trailhead sign-in sheets, other)	Public events at this location (volunteer days, tours, parties, other)	"Wildness feel" (such as natural features to conceal man-made features or vegetation restoration)	Write in: infrastructure (pavement, route, trail definition, better access)	Write in: trash clean up
Other (n=34)	15%	18%	18%	18%	6%	12%	9%	29%	0%	18%
Fishing (n=11)	9%	0%	9%	18%	9%	9%	9%	9%	0%	9%
Tourism (n=6)	0%	0%	50%	0%	0%	0%	33%	17%	0%	0%
Park Use (n=11)	27%	27%	9%	18%	27%	9%	0%	36%	0%	9%
Birding (n=103)	14%	11%	11%	11%	7%	7%	14%	23%	0%	10%
Horseback Riding (n=36)	22%	11%	11%	0%	0%	0%	22%	22%	0%	22%
Bike Riding (n=128)	5%	8%	6%	5%	7%	5%	6%	18%	0%	6%
Running/ Walking (N=44)	5%	27%	27%	23%	14%	7%	2%	39%	7%	20%

Table 13 – Types of suggested improvements by user group

What are your ideas to improve this location? (Select from our examples, or enter your own:)										
	No changes are necessary	Increased maintenance of existing amenities	"Small" amenities (trash can, bike rack, bench, picnic table, pet waste bags, other)	"Large" amenities (drinking fountain, parking, shade structure, improved access to the river, other)	Information (Educational display, directional signs, other)	Community enhancements (a bulletin board, trailhead sign-in sheets, other)	Public events at this location (volunteer days, tours, parties, other)	"Wildness feel" (such as natural features to conceal man-made features or vegetation restoration)	Write in: infrastructure (pavement, route, trail definition, better access)	Write in: trash clean up
Three Rivers (n=141)	13%	9%	10%	12%	10%	6%	11%	23%	0%	10%
Cortaro Narrows (n=79)	10%	9%	13%	9%	6%	8%	8%	25%	0%	10%
Marana Flats (n=30)	3%	0%	3%	7%	3%	3%	3%	20%	0%	13%
South of Grant Road (n=72)	10%	19%	14%	14%	6%	13%	7%	25%	0%	14%
Rillito Wash (n=19)	5%	11%	11%	16%	16%	0%	0%	21%	0%	0%

Table 14 – Percentage of improvement suggestions occurring in each reach

Final Recommendations

Based on the results of the community engagement effort, Sonoran Institute recommends the following:

Based on Level of Familiarity data, the biggest public education priority continues to be the recent improvements in our river. Additional outreach and new forms of communicating the history of the river would help broaden support for Santa Cruz River initiatives.

Open space and water security scored highest as a river value and a management objective among nearly all populations and groups. Management decisions that enhance these aspects of the river corridor would be more likely to be supported by the public at large.

There was often a “grass is always greener” dynamic with the flood safety different reaches of the river have slightly different priorities. For example, areas that have fair to adequate flood protection structures are often more concerned with naturalness than the areas without. The areas without flood control devices are often concerned about the risk of flooding and the cost of insurance.

Though low-scoring in the online survey, water visibility was a key factor in where users decide to visit the river, indicating that the ability to see water may be more important than our online survey data alone suggests. Future community engagement efforts should include additional exploration of the Water Visibility. The phrasing of this topic in the online survey was unclear so should not be used for decision-making without further research or discussion.

Similarly, the perception of financial gain from the river should also be researched further. If the public truly does not see direct personal benefit from the river, that may indicate need for corridor improvement, or public education on the role of river corridors in local and regional economy and/or property value.

Everything is tied to access to the river. Users will only like places that are easily visited. For example, the interactive map collected less data about the Rillito yet it was still more “liked,” possibly because that area of the river pathway has been integrated into the surrounding areas for a longer time. The population in this area may be denser, making it more convenient and better known. The mainstem may receive greater appreciation from the community if access were increased in areas that exhibit valued characteristics. For example, additional bathroom facilities to support large groups (such as tours and school groups), trailheads with space for horse trailers are two specific improvements that were mentioned.

There may opportunities to draw new types of users with specific interests. Cultural heritage was cited as the most interesting aspect of the river, so creating accessible sites to celebrate heritage would draw new user groups. Birding and cycling are currently the most frequent use, and support for those activities should continue.

Additional outreach, such as repeating this process, in other reaches of the river would be necessary to make spatial comparisons outside of the flowing reach. Additional outreach areas might include along the Rillito, Green Valley, South of Grant Road, and in Santa Cruz County.

Appendix A – Survey Formatting, Vetting, and Outreach

References

Arizona Department of Game and Fish. (2017). *Arizona's Most-valued Hunting and Fishing Locations*. <http://azgfd.maps.arcgis.com/home/item.html?id=72ef284e22ab441b81c72472409c5d24>

Borderlands Restoration. (2017). *Public Values and Preferences within the Sonoita Creek Watershed*

Institute for Sustainable Infrastructure. (2017). *ENVISION Sustainable Infrastructure Rating System*.

Ritchie, J., & Lewis, J. (2003). *Qualitative research practice: a guide for social science students and researchers*. London: SAGE Publications Ltd.

Town of Marana. (2016). *El Rio Preserve Project online survey*.

United States National Forest Service. *Public Values and Preferences regarding Forest Uses and Management on the Puke and San Isabel National Forests, Colorado*.

United States Geological Survey. *Social Values for Ecosystem Services (SoLVES)*. <https://solves.cr.usgs.gov/>

University of Arizona Cooperative Extension. (2017 Presentation). *Survey of Public Perceptions Regarding Water Reuse in AZ*.

Weber, Matthew. (2016). *Valuing instream-related services of wastewater*. Ecosystem Services. V21. 59-71

Weber, Matthew. (2015). *Priority river metrics of an urbanized arid watershed*. Landscape and Urban Planning. V133. 37-52

Organizations contacted in the vetting process

We wanted the survey to be relevant to as many stakeholders and user groups as possible, so we invited many organizations to participate in multiple stages of survey development. Many of these organizations were also asked to help share the survey with their members or networks.

- Arizona Roadrunners
- Bureau of Reclamation
- City of Tucson
- City of Tucson Bicycle/Pedestrian Office
- Community Water Coalition, and their many members
- Flood Control District Advisory Committee
- Flowing Wells Neighborhood Association
- Living Streets Alliance
- Marana Water
- Metro Water
- Pima Association of Governments
- Pima County Office of Sustainability and Conservation
- Pima County Regional Flood Control District

Community Values and Management Preferences

- Pima County Regional Wastewater Department
- Sonoran Institute Staff
- Town of Marana
- Tucson Audubon
- Tucson Saddle Club
- Tucson Water

Outreach Venues

- Media
 - KXCI Community Radio
 - Arizona Public Media
 - KVOA Channel 4 News
- Newspapers
 - Arizona Daily Star
 - Marana
- Outreach Events
 - Loop the Loop
 - Neighborhood Association Meetings
 - Living River Report Release
- Flyers at Pima County Libraries
- Paper Mailers
 - Pima County Wastewater utility bill Inserts to all residents using four major regional utilities.
 - Postcards to 500 residences half-mile distance from the project area
- Websites & Social Media
 - Facebook posts and an ad
 - Community event calendars
 - Nextdoor
- Digital Newsletters
 - Tucson's Neighborhood Nugget
 - Tucson Water
 - Water Resources Research Center Weekly Wave
 - Emails to our lists and local stakeholders, including directly contracting representatives from different user-group communities, such as bike shop owners, Tucson Saddle Club, Arizona Roadrunners, Tucson Audubon and more.
 - Direct emails to Home Owner Associations and Neighborhood Associations

Appendix B – Further Discussion Notes and Participant Comments

Workshop Small Group Discussion Notes

Overall Impressions

There was consensus among the workshop attendees that they support the work we're doing to create an engaged community.

Flowing Wells:

- It is timely to be having this conversation (referring to CE efforts).
- River and water security is not well understood by the general public.
- Increased Public Education
 - Source of the water & it's impact of replenished groundwater.
 - The role of effluent as a commodity,
 - both directly as water
 - indirectly for supporting trees and the other benefits of the river.
- Lots of discussion about greater water-policy issues, like CAP, water shortages on the Colorado and Arizona's status, importance of local water security and education, the Heritage Waters project, and engaging local stakeholders.

Cortaro:

- Need for increased stewardship and volunteer days to clean up the river
- Biggest threats to river restoration efforts are political will and lack of public awareness.

Flood Safety

Some workshop participants in Marana emphasized concerned that flood safety should be the primary objective. Other workshop locations did not discuss flood safety with the same emphasis. In other locations, flood control infrastructure was occasionally mentioned as a hindrance of the natural environment.

Marana:

- Flood safety should be the first objective. Rivers sole purpose should be as flood water conveyance.
- Most people who took the survey are removed from the real hazards of flooding. They had too much influence on the survey results.
- Town of Marana's flooding and drainage plan only includes upland inhabited areas, but it doesn't consider mainstem flows.
- Vegetation increases risk of flooding. River doesn't self-scour like it used to because the daily effluent builds up vegetation. Land owners near the river are not able to maintain it themselves because they would need an Army Corps of Engineers 404 permit.

Water Visibility

This topic requires further investigation. Small group discussion revealed that the phrase "high use" in this question was ambiguous was occasionally interpreted as housing and development, not recreational areas as was intended. Increased housing density tends to be viewed unfavorably, so that interpretation may have negatively influenced the results.

However, further discussion did show some mixed perspectives on the value of water visibility (see Cortaro). Water Visibility is linked with recreational access.

Flowing Wells:

Community Values and Management Preferences

- The phrase “high use” suggested that the area would become “more developed” not recreational areas, which may explain the aversion to this option.
- “Visibility” could be interpreted to mean “water clarity”
- Access and knowledge that it is there may be more important – “Presence”

Cortaro:

- Arguments For:
 - Seeing flowing water is uplifting
 - We need access points to see the water
 - Sweetwater wetlands is a good model for visibility and habitat
- Arguments Against:
 - Users will seek it out if they want to see it
 - Knowledge that water is there is more important than being able to see it
 - Natural rivers move out of site, seeing it all the time means its controlled
 - River is for wildlife, not for us to see

Marana:

- Want easy access from multi use paths and bridges

Financial Benefit

The Financial Benefit question was intentionally phrased to on personal benefit, which limited the scope of the benefits that would be considered. Discussions would focus on both direct personal financial impacts and the rivers role in the bigger picture of Tucson’s economy and appeal and ecosystem services.

Benefit on an individual scale:

Flowing Wells:

- Most survey respondents may not live near enough to the river or work in an industry that would gain financial benefit directly.

Cortaro:

- Some workshop attendees also noted that there are many people who may not fully recognized how the river would increase property values. Additionally, some of the wastewater treatment facility upgrades have led to less tangible improvements, such as odor reduction, which indirectly increased property values.
- Other research in regional communities indicate that some residents do not like recreational improvements because it reduces the privacy of their homes.
- Some perceive the river corridor as unsafe or dirty

Marana:

- The river may have a negative impact on personal finances if the flood insurance rates are not made more affordable.

Financial benefits in the bigger picture:

Flowing Wells:

- Local food movement – tie effluent into agriculture
- Santa Cruz River could be promoted as “Intro to Birding” guides for those who are just curious about the hobby.
- An improved SCR may lead to increased tourism dollars, like the San Pedro

Cortaro:

- Birding tours, bike shops on the Loop, and other recreational tourism was frequently brought up as a source of financial benefit.
- Desert rivers have lower scenic value compared to other areas in the county, and out-of-towners or “snowbirds” may not have an accurate expectation or appreciation of a healthy river in the arid southwest.
- There was a mixed perception of how the river could be elevated in the public eye. The Tucson Water proposal to divert water to downtown was occasionally brought up by attendees. San Antonio was often cited as a river-centric economic development approach, but that example style/approach may not be a match for Tucson.
 - Related to the diversion, there was concern about losing the environmental benefits in this reach.

Habitat

There was general agreement across the workshops that “maximizing benefit” would include maintaining wildlife linkages, naturally vegetated banks and trash removal. Most attendees were focused on bird habitat. However, a few residents from Marana were particularly wary of habitat restoration that would exacerbate flood impacts.

Flowing Wells:

- Unobstructed access for wildlife, and enough food and shelter.
- Not constructed banks
- Need overbank areas next to washes & tributary connections for wildlife connectivity, network to mountains
- Diversity of native plants, vegetation layers, and age of vegetation.
 - Water is a necessity

Cortaro:

- Wildlife linkages
 - Connected habitat corridor with open space
 - Access to the river to mountains to the west
- Native vegetation/diversity of vegetation types
 - Vegetated along the banks
 - No visible trash

Community Values and Management Preferences

Marana:

- Maximum habitat would be what's best for the birds, which is also best for the people
- Natural vs Manufactured habitat
 - Artificial habitat makes other parts of the ecosystem suffer. Enhancing vegetation with intentional plantings is just increasing flood risk, as well as other problems like pests, expense, and more.

Recreation

There were occasional comments about the need for increased recreational access, but refer to the interactive maps for more on this subject area.

Flowing Wells:

- South of Ina Road has low access
- Access to corridor by horseback

Marana:

- there should be more opportunity for dispersed style camping, like in the mesquite forests

Cortaro:

- Access to open spaces is important for community cohesion, appreciating the environment and place-making.

Native Species

Flowing Wells:

- Would prefer something pre-development

Cortaro:

- Non-native species increase the fire risk. Buffelgrass is prominent north of Cortaro Burns.

Pests

Cortaro:

- Mosquito control is important for reducing disease vectors.
- Marana El Rio survey also showed bigger concern for pests than these data imply.

Other Comments

Cortaro:

- Concern about diverting water off this section of river
- Need to look for best place to recharge
- Are there policies and best practices in place to minimize impact from construction and development?
- Utility easements are constraints on any management, especially high voltage

Marana:

- Need public education on the “source” of the water – meaning effluent.

Survey Feedback

Cortaro:

- More examples & imagery would have helped clarify intent.
- How did survey ask about safety? [interactive map]
- Advice on how to best gauge a sense of stewardship/ownership that can be applied to other areas?
- Loop trail is very popular in this area, a good method of outreach [true, we did reach out to bike shop owners near the loop.]

Flowing Wells:

- How to prevent multiple survey submissions from one person who intends to bias the results? [In response: Unavoidable without restricting sign-in and/or losing anonymity. Did look at the results for similar responses close in time.]

River Values, additional comments from online survey

The Santa Cruz is why Chukson became a settlement. It is part of our heritage. Water is vital for life. Greenspace in and through urban areas is important for the wellbeing of the inhabitants. Nature restores and heals, concrete does not. More water, less building!
River parks are generally not convenient for me.
nonnative if not invasive, managed fish could be allowed for fisherman
I took a field trip with Ochoa Elementary School students last year and learned about a lot of this; I want there to more emphasis on reaching children and parents so kids can get outside and enjoy the river and its surroundings.
My neutral statements reflect that I do not live in Pima County. In relation to flood safety, I would argue protecting the river corridor more than the infrastructure of Tucson. The existing infrastructure present today must be protected, but any future developments in the flood plain, should focus on protecting the riverine environment from Tucson, rather than Tucson from the river
There is so little water in the Tucson area, it's important to preserve what we have for its contributions to the community's beauty, wildlife, historical remembrance, and water preservation for people's use. We love to bird, and without the river flow birds won't come.
River path provides an excellent space for recreation free of car traffic

River Values, additional comments from online survey - continued

I strongly believe that the Santa Cruz River should be used as a refuge for endangered species such as the Arizona Leopard Frog, or even Chiricahua Leopard Frog, if biologists feel introducing the latter is a good idea; the Quitobaquito Pupfish and the Gila Topminnow. These species need every bit of water free from invasive species that they can get.
The efforts to restore the Santa Cruz speak to who we are as people on this earth. No expense should be spared to take care of this vital resource.
Regarding non-native invasives - some of these species have taken hold along parts of the Santa Cruz (tamarisk trees) and are providing great habitat. The strategy should not be to eradicate them immediately. Native species through restoration efforts need time to establish and would provide the same level of habitat. This is a long-term process and can take 10-20 years.
Esthetics, nature deficit disorder, groundwater recharge, cooling trees to walk next to, flowing water is primal/soothing
While it is important for me to have resilient features. Use of the land and resources means the most to me.
The easy or cheapest way to achieve some of these goals may not be the easiest or cheapest way to achieve all of them. A well-maintained ecosystem can derive the beauty, flood protection, and financial benefit with the primary purpose of environmental resiliency and is the only option this project should consider!
During the monsoon people flock to the river there is something magically attractive to people in a flowing river
It would be great to eliminate non-native species, but that may not be practical.
Like the lovely rivers in Farmington, NM and Fort Collins, CO - the Santa Cruz River has the potential to attract visitors and their recreational dollars to Tucson. But our misuse and abuse of the river has made it an eyesore. Just look at the excavation of gravel and sand along its banks.
It makes us feel alive
Every one of these points is important
Open space, recreation, and ground water management are necessities for our future.
The connection with the overall loop is very important for both community health/exercise benefits and commuting by bicycle.
<p>Your question about replenishing groundwater conflated the need to replenish groundwater with the need of future cities. Those should be two separate questions. Replenishing groundwater is also important for maintaining native vegetation -- and you didn't mention that as an important reason for replenishing groundwater (not to mention reducing future subsidence cracking).</p> <p>2. Managing the river to protect people and property from floods. Unclear how you are proposing to do that. In some places people think that means REMOVING all the vegetation so brush doesn't get torn up and float downstream and pile up against bridges. What I want is for the river to become even more natural.</p>

River Values, additional comments from online survey - continued

Answers are related primarily to opinion of public need/economic benefit; I do not spend much time around the river, nor do I have a dependent business.
This natural area is one of Tucson's jewels and should be preserved with nature in mind. It should not be developed like a "San Antonio River Walk."
Re flood safety: manmade management is not always best for water courses, and should be approached with great care and backed by LOTS of education and ongoing research. cf Mississippi River (I'm from Louisiana.)
Arizonans wrecked the Santa Cruz by unlimited ground-water pumping; it's good to see us reviving even a part of the river!
Rivers and (potential) riparian areas should not be paved over and should be restored as much as possible to a working system.
Flowing water is our land's life blood.
Most important thing is preservation and rehab of the river. It will also add value to the downtown and westside communities.
I remember that when I was a child, the river ran more freely. I miss it! Anything that brings it back is a blessing.
The cleaner water the better! I've never seen any birds using the water in Tucson. Or looking for food along the water so there's a long way to go before it's natural
Improvements to water filtration have greatly improved the odor of area
Riparian areas in the desert are vital. Water is life.
Water Supply: While refilling our aquifers is very important, implying the only use is future city use negates important natural uses (for riparian trees or flowing rivers, for example). From above: "for future use in cities."
This is such a special place to me. It is a place I can relax and for a moment destress. I strong believe in the work that pima county has done to reclaim the Santa Cruz.
20 some years ago I used to frequent the Santa Cruz with my dogs near Ina Rd. The water was poor quality then, but we enjoyed it so much anyway. Now I live more near the Rillito which we frequent a lot. Now that I know more specifics about the upgrades, we will drive across town to enjoy the Santa Cruz.
Why I didn't rank them all high... Regarding flood safety, yes very important but methods that allow the river to have more flood plain are best. Purchasing houses in the flood plain in the past was an important solution with safety, economic and sustainability benefits. Regarding temperature, currently heat maps show that dry streambeds are hotter but with more vegetation this could be mitigated.
I think downtown to Grant Road is a more "important" stretch of the river for the city.

River Values, additional comments from online survey - continued

<p>Most non-native plants are not of concern. Exotics removal and control should be targeted and intensive for species of real concern: bullfrogs, crayfish, exotic fishes, tamarisk, and buffle grass. Adding additional species usually thought of is a waste of time. Certain winter plants should be targeted. Niche-filling natives must be managed for, or the efforts will fail.</p>
<p>Living very close to the Santa Cruz and the loop path makes me very interested in ways it can be enhanced for both recharge and recreation.</p>
<p>One cannot over-emphasize the river's importance or its uniqueness.</p>
<p>As a recreational feature the Loop is one of the main reasons I live in Tucson. I often marvel that the feeling of riding on the Santa Cruz gives the feeling like I am in a different community. I love the section North of Ina because it is so lush. To expand this all the way South to Grant and beyond will be great for tourism and locals alike.</p>
<p>I don't think people should be damaged by flooding, but I would prefer to see more avoidance of river corridors by development rather than confining rivers so that people can develop more and more land adjacent to natural flow paths.</p> <p>I do not necessarily think recharge should be for future use by cities. Shallow groundwater is important to ecosystems, and I support ecosystems rather than overuse of water by people. We could do much, much more to reduce potable water consumption and allow the earth to function hydrologically.</p>
<p>Q1, "Water Supply." I strongly agree that "water in the river corridor is ideal for replenishing our groundwater supply" but not if the premise of the question is that the groundwater supply is only important for "future use in cities."</p> <p>Q7, "Flood Safety." I strongly agree that the HISTORIC FLOODPLAIN and WATERSHED should be managed to protect the public and property from floods. This should not take the form of mere bank protection on the RIVER CORRIDOR, but it should take the form of a 50-year plan to remove most settlement and commercial development from the historic floodplain and allow the river to flow in most of the historic floodplain again. This, and watershed management (including replenishing the porosity of floodplains--their ability to ameliorate flooding) is the only long-term way to effectively protect the public from flooding.</p>
<p>the river is a valuable component of the Tucson area community</p>
<p>Keep it natural. No "management" except promoting treated effluent recharge. No concrete-stabilized embankments and similar infrastructure.</p>
<p>"Naturalness" should also include methods of flood control. The river banks are very ugly.</p>
<p>Trees and shrubs are overtrimmed and the county and taxpayers can save a lot of money by letting vegetation grow naturally. Sure, it allows people to hide among the vegetation but I'll take that risk for extra shade and bird habitat. Important bird habitat is being destroyed by overtrimming. Workers should only conduct tree trimming maintenance in the fall and winter, when nesting is the less likely to occur. Their current work schedule either destroys nests directly or causes birds to abandon nests from too much disturbance or resulting overexposure from vegetation removal above and below nests.</p>

River Values, additional comments from online survey - continued

Cleansed wastewater should only be recharged along the reach of the Santa Cruz River north of Sweetwater Drive.
People flock to the river during monsoon season, it's like moths to the flame. I find everybody in a desert really enjoys running water. A running river next to downtown would be a game changer, just saying... ;-)
Aquifer replenishment is important and needs more research on water quality
<p>I love this river. The year around flow has greatly enriched my life, and the habitat for local predators (birds and mammals) has led to me being able to witness some incredible parts of nature.</p> <p>The only part of this discussion that I have some very difficult inner conflict about is the presence of non-natives in this habitat. I was drawn to this river for the carp, and they are the main reason I return to this river and continue to use it.</p> <p>That being said, I am also interested in the return of native fish to our streams and rivers and would love to see this habitat used to promote populations of our endangered natives. Though the carp are not flood resistant like native fish, they would be competitors to them and would, as far as I know, limit the native species' ability to get a foot hold. Esp. with the presence of the Salt Cedars. From what I can tell, the root systems of invasive Tamarisk are the main protection for carp populations during significant flooding events, and the carp populations rebound the quickest where the Salt Cedars are the densest. This co-operation between the two invasive species would keep carp populations thriving and competitive (read: dominant) despite native fish being more suited to our traditional river flow variations.</p> <p>All that to say, I would absolutely love to see this river become a much needed habitat for native fish, but I am worried about their viability when competing with carp, and, selfishly, I don't want the carp to go anywhere.</p> <p>I am also worried about access for fishing being an issue as this project is developed, as well as regulations on fishing if native species are introduced.</p>
I feel this is a tremendous asset to our community.
I would love to be able to take my kids to the playgrounds and river walk but there are always large groups of homeless people drinking doing drugs and behaving violently.
I would love to be able to exercise and socialize in the riverwalk park but there are large encampments of homeless people hanging around the playgrounds drinking and doing drugs. There seems to be little or no police patrolling the parks.
Some portion of perpetual water flows and related riparian habitat should be preserved.
I moved to the property I have lived on since 1999 because of the river access....
It's nice to see families using the river loop. Builds community identity
While a paved path is nice for most users there should be non-paved trails for horses. And there should be more trails that are interactive along the river...not just trails along the upper banks.
I value a return to the perennial river of a century ago.

River Values, additional comments from online survey - continued

This is part of the old failed Rio Nuevo, which failed under previous administrations due to an over influence and political kickbacks from environmental groups. The downtown area including the proposed water/Riverpark would have created many jobs and attracted thousands and thousands of tourists to the area of Congress and Broadway and I 10. If the city councils desire to destroy the local economy and drive people out they succeeded
River has "value" without us saying so.
This was a very important habitat before we pumped the water table down. We should manage the water flow to try to recreate some of that habitat.
It is the reason Tucson is here for over 1000 years. It is the center of life here we are not a sustainable city without water.
The river can provide beauty, increased property value and function to help clean and recharge our treated water.
I have wanted this stretch to happen for years now. I have seen pics of what it used to look like and I would love to see our Tucson embrace this corridor once more as a natural preserve. I have enjoyed the pieces that do have running water as do so many other runners, bikers and birders along the path. My only concerns are the garbage and homeless issues that can be found along some of the current parts of the river. The river ends up dumping thousands of pounds of trash into the Marana Coachline lake as well as collecting along the river. I'm not sure what kind of resolution there is to this problem besides education people to throw their trash into the garbage bins. This corridor is extremely magical. There are so many wild critters that live here. I've lived in Tucson for 20 years now and I know this wash/river well as a birder. There are so many incredible opportunities here. This path/corridor can connect to places like Sweetwater and various parks. When there are people involved, safety is always a concern. Perhaps emergency beacons...the blue lights along the path could be installed for people coming back from their sunset walks. I am really excited about this project. Can't wait to see what happens! Chris Rohrer
Establishing native fauna corridors for all forms of wildlife is essential as human activities eat up ever more rare areas of sanctuary and feeding for all forms of native wildlife. I understand and appreciate the need for ground water replenishment in Pima Co. but I know from my own birdwatching and, in discussion with biologists not associated with any of the Co. departments, that the water discharged into the river from the Tucson Sewage Plant is so void of nutrients, it has limited value to support feeding for many species of animals and plants. It's water and it's percolating downward but the video is a bit of a whitewash on the impact. The buffelgrass infestation in the Santa Cruz and surrounding areas is a critical issue. Pima Co, City of Tucson and surrounding Counties need to have a coordinated effort to address the Buffelgrass infestation.
Loved the video - well done. Touched all the questions I had.
I bought a house on Santa Cruz Lane because of the river access. I use it every day, sometimes all day or 2-3 times a day!
Flood safety and not allowing construction in flood prone areas should be number 1 priority.

River Management Objectives, additional comments received via Online Survey

We, as a species, tend to over-do. First, we over hunt/gather/develop/use and then go overboard trying to correct our over use. Let us be wise in how we go about trying to restore the river and not micro-manage it. Yes, restore the flow but do not overdevelop areas around. Keep it as natural as possible.
It should be managed to benefit native wildlife and plants. It should, also, be managed in a way that people who want to view nature can enjoy it by hiking, walking and birding. There should be adequate walkways and parking lots that have access to the trails. Lastly, mosquitoes should be kept under control so that people can enjoy the park and not be exposed to disease.
Not addressed by your survey is the presence of homeless individuals camping in the dry riverbed. These folks leave a tremendous amount of garbage (and probably human waste) in the riverbed when they use and abandon their campsites. I would like to see assistance and/or housing for the homeless as part of the strategic plan to manage the river.
The wording of your questions uses obscure terms and ideas. In other words, the intent of your questions is often unclear.
natural trails, wildlife, native plants are good for people to have access to
While flood safety is a priority, it would be better to prohibit development in flood-prone areas.
I think the river should be managed to benefit the species present there, but that emphasis should be put on managing/enhancing native species whenever possible Tucson will have to manage the recharge into the aquifer, but perhaps this process could reflect management of the water for future Tucsonan's, as well as the river ecosystem? I am for water harvesting, but then that water is unavailable to the groundwater until a later date. Perhaps I don't understand the question?
I think that improving the river in general will make it easier to accomplish a lot of the other goals e.g. recreation, flood safety, community because people will see that it can be done and that it does have huge benefits to us
I rank recreation the top priority because I believe that will drive resources and public will to continue to invest funds to support other priorities
Bring the flowing river where the people are!
Flood hazards should be addressed by restricting development in the floodplain.
Contrary to City Manager, PC supervisors, and politicians, this is NOT, ABSOLUTELY NOT, about finance, economic growth, development, industry, or monetary savings. This is about a natural resource that has been polluted, and needs to be restored and protected.
I believe that flooding would not be an issue if the river had been allowed to keep its cottonwoods and other big trees that were there originally. Taking out the invasive tamarisk and reinstating native trees should be a priority.

River Management Objectives, additional comments from Online Survey – continued

<p>If flowing river sections have to be managed for human safety or agricultural interest, it should be done in a cost effective way in terms of money and water management</p> <p>The river should be managed in the sense of effectively protecting Tucson during flood events, but otherwise I would let it pick its own course, as much as possible</p> <p>Climate change must be addressed</p> <p>Develop a flood strategy that protects the people of Tucson, but also protects the river and any improvements your efforts have had.</p> <p>Locate the sites of recreational facilities to benefit the river structure and not the community, if you do it right, they will never know</p> <p>I would redirect the river, to high visibility sites, only if it benefited the river</p> <p>I would manage water generated pests, with unlisted native fish</p>
<p>Develop and manage as a wildlife corridor with a few amenities built on a small scale, but no large recreation facilities like parks and athletic fields unless they are off the riparian corridor.</p>
<p>Re minimal management: depends on management choices - some are better than others, and any choice should be studied thoroughly before implementing. Re water supply: recharging groundwater is most important of all, but your question then conflates it with 'future use by cities' - recharging is sine qua non for everything else, please focus on that. Future use is important, but ought to be down the road a bit. Unbridled growth is part of what got us in trouble.</p>
<p>Almost any active management, as opposed to neglect, is good. We DO live in a desert!</p>
<p>habitat protection and climate change mitigation are most important! Also control of flooding in a sustainable way, i.e. NOT with concrete.</p>
<p>The river should be restored and replenished as much as possible, doing what it naturally does. Flooding is a part of what a river does (within limits of catastrophe) --human habitations and businesses should be discouraged in flood plains. Regional health requires provision for all native species, humans, plants, and animals, and a consistent water supply is a top priority. Without it, none can live here. Climate change is real and upon us and needs to be planned for. I'm happy to put my tax dollars to work keeping Tucson habitable.</p>
<p>Birds eat bugs and mosquitoes. So do frogs. Keep the poisons out!</p>
<p>not sure what plan or length of interference in consideration for the Santa Cruz project to answer</p>
<p>Conservation of water in terms of watershed management is critical to restoring the health of the Santa Cruz River as a living river.</p>
<p>I think having a health river system helps to have a health community and benefits us all.</p>
<p>I loved using the Santa Cruz with my dogs in the 80s and 90s in hard to reach areas because there were no restrictions on use and the area was free from people. I hope there remains a viable option for citizens to experience the river in that way.</p>

River Management Objectives, additional comments from Online Survey – continued

The nuisance pests are also a vital part of the food chain for many important animals such as bats.
My top priority is managing water resources for future groundwater security that also ensures instream flows due to both groundwater connection and effluent flows
Any "pest" control should be as natural as possible and flood control should try to minimize impact as well, esp. regarding birds. "Weeds" are a valuable part of the equation.
If one encourages interaction with the river, it will lead to more public support in the future.
<p>Q7. "Flood Safety." Again, flood safety is a high priority but I believe by "flood safety" you mean mainly river-soul-sucking bank protection. The only true way to protect people and property against flooding is NOT TO BUILD on the historic floodplain, and (since much of that has been allowed already) to decrease housing and commercial development on the historic floodplain with a long-term plan.</p> <p>Q8. "Water Supply." Again, why do you link the value of recharge with "water available for future use of cities"? I value the first but not only to the end of domestic and commercial water supply. It should be a goal in itself. We should provide "future water supply" through drastically reducing use and waste of water, not through just increasing supplies of potable water.</p> <p>Q10. "Recreation." I DO consider recreation a high priority but I believe you are referring to recreational facilities on the historic floodplain that would need to be protected from flooding by bank protection. I could answer this question with a higher priority if you were talking about recreation that was consistent with a restored historic floodplain, or facilities that enhanced floodplain function on the historic floodplain or that ameliorated flooding not by containing it and shunting it downstream but by infiltrating it. Most of my recreation would be enjoying the plants and animals of a restored historic floodplain, not playing soccer (e.g.) in a facility that is harming the historically and culturally and environmentally important historic floodplain.</p>
Incorporate an urban fishing area
I strongly support using the effluent for maintaining and improving vegetation and wildlife values and recreational enjoyment
There is so little of the original riparian habitat left in southern Arizona- any opportunity to remediate the losses is of huge value. Pressure on the many species of plants and wildlife that depend on the unique characteristics of riparian habitat is continuing to increase due to the expanding populations in communities near important riparian areas in southern Arizona. Although efforts restore or remediate the loss of habitat cannot fully replace what has been lost, it is still vital to preserve and nurture what is left. The resulting habitat will enhance the appearance of this area to families, cyclists and pedestrians and other groups using the river parks.
NO infrastructure management (i.e., flood control) other than effluent recharge. Let nature take its own course. Expand setback and flood zones, prohibiting development. No paved embankments, no earth moving, no tractors, etc. Many of the problems of our river have been worsened by "management" by the Pima Flood Control District.
Maintaining water (even effluent) in the river is my top priority, but you did not offer it as a choice. Compared to what is possible upstream, there is more space for effluent-dependent habitat along the downstream reaches than in downtown Tucson, and it would cost society less.

River Management Objectives, additional comments from Online Survey – continued

Restoration of the river and its tributaries is critical for the environment AND the economy
It would be nice to get rid of non-native species but given that they presently represent a large quantity of the vegetation present I think it would be difficult, expensive and in the end Sisyphean to try to remove it all.
Water harvesting is great at home. However, all upstream tributaries should remain free of vegetation to maximize drainage flow to primary channels.
Putting trees on both sides of the loop makes shade for the path and creates a wind break. I love when you have shade and a wind break, it makes using the path possible even mid-day during the hot summer months.
<p>I am of two minds about what I would want your management approach to be.</p> <p>As someone deeply invested in habitat restoration and restoring out streams, I want you to manage the habitat and use amazing resource to return this amazing resource to what it once was.</p> <p>As a sportsman who loves this river for its lack of people, regulation, and for its amazing carp, I very much want you to leave it alone and just let it be.</p>
I do worry about flooding with the changes from climate change. Would like to see water catchment areas, like ponds/lakes created to catch flooding flow of river in summer storms and winter wet seasons. Garbage clean up would help a lot, as homeless people camp in the river wash and leave much detritus. Regular pick up by community groups, incarcerated workers, parks and rec workers, as community service in lieu of fines for city violations, school student groups, etc. Also, murals and art projects along river would be great (I am a muralist and supervisor of youth art projects and would love to head up a team to make beautification and educational art pieces all along the Santa Cruz River Wash.)
I also believe sustainability of projects and projections for the river need to be primary as well.
I love to walk along the river to watch the birds that come to the trees and water. I think that with Climate Change, the big reason this water should be sent along the river is recharge. We are going to need that water!
If you build this river community and recreation areas around the Santa Cruz between Valencia and other areas throughout Marana, you'll be able to attract many tourist and residents from areas like Vail, Oro Valley, Marana and the greater Tucson area. This will increase the tax base and that tax can be used to repair roads, maintain our infrastructure that is been the cane for the past decade if not more. Again, due to poor decisions on behalf of a single party city Council
At this point, we have disturbed the system so much that it will require active management to achieve the goals listed above. That said, it should be done with the minimal amount of additional disturbance necessary to achieve the goals.
"Tempe Lake" has worked, let's create something like that for Tucson.
Preserve flowing water for wildlife and humans, maximize groundwater recharge in stream, balance with infrastructure and public safety protection

River Management Objectives, additional comments from Online Survey – continued

In favor of managing the river to slow its flow so there is bank to bank riparian habitat while allowing for most of the water to seep into the ground and not leave Pima County.
Retain the natural environment. Humans are then visitors.
There are three main things here. Potential flooding, mosquitoes and recreation. I think it's always good to have control over the water release in case the monsoon rains bring torrential rains. Mosquitoes. At Sweetwater, I think they are well managed and have been happy with how it's handled there on Mondays. But bugs are good for the wildlife. Not so good for residents living along the corridor. Marana residents along the Coachline Lake/Park would be good people to contact as they are currently developing this amazing location. And finally. This should be for people and wildlife both. Too many people however in one location could cause a disruption to runners, bikers, etc unless of course it's a biking event etc. I just don't want the paths to turn into Tempe Town Lake where there are WAY TOO MANY people during our winter months. Perhaps small parks along the path would be great for people to picnic and gather since that is a popular thing for many people here in Tucson with our diverse culture. HOWEVER, no balloons! :) I think this should be a natural exercise path similar to those used in Colorado and in several locations up in Phoenix like Papago Park BUT with contained picnic areas. The trails should be left free of large human gatherings :)
We are in a regime of human management of a natural resource thus, it will never be completely beneficial with no or little negative impact. Therefore, it is essential to set a singular priority for the management of the river and for one would argue that priority must be habitat and benefit for native plants and animals. The river must be managed to protect property and safety. I believe both can be suitably be addressed with purpose driven management, focused on long-ranged goals and targets. Will it be perfect and free of debate or criticism? No, never but if the actions and course of the County's efforts to manage the river are consistently focused on the accepted priority(s) and goals, it will weather the negative feedback and succeed to deliver to the public a valuable natural resource.
Expensive programs that benefit a small, vocal minority and require constant maintenance should not be funded
Trying to maintain as much wildlife and river habitat is a duty to the environment since human actions have nearly wiped out the Santa Cruz as a functioning natural river.

Appendix C – Additional Survey Results

River Values Results by User Group

"Please indicate how much you agree with the following statements about this stretch of the Santa Cruz River." Possible River Values score results range from -2 (disagree with that value statement) to 2 (agreed with that value statement). An even 0.0 indicates a neutral opinion.

	Flood Safety	Open Space	Environmental Resiliency	Financial Benefit	Commuting / Exercise	Community	Water Supply	Naturalness	Cultural Identity
User of Riverside Parks / Playgrounds (n=42)	1.52	1.69	1.00	-0.24	1.19	1.02	1.40	0.95	1.45
"Other" User (n=23)	1.17	1.22	1.00	-0.22	0.65	0.57	1.09	0.91	0.83
Runner / Walker (n = 58)	1.14	1.34	0.90	0.31	1.31	0.83	1.24	1.09	1.16
Resource Manager (n=11)	1.00	1.82	1.27	0.18	0.64	0.45	1.00	1.64	1.55
Neighbor / Passive Appreciator (n=81)	1.17	1.27	1.25	-0.03	0.60	0.64	1.32	1.11	1.24
Environmental Advocate (n=91)	0.98	1.82	1.55	-0.13	1.09	0.86	1.49	1.30	1.57
Horseback Rider (n=8)	1.50	1.75	1.75	0.57	1.50	1.50	1.63	1.00	1.50
Hunter / Fisherman (n = 17)	0.94	1.24	1.00	0.00	0.88	0.63	1.29	0.69	0.82
Bike Rider (n = 110)	1.30	1.71	1.38	0.09	1.75	1.11	1.55	1.15	1.27
Birder (n= 59)	1.24	2.00	1.73	0.14	1.29	1.25	1.44	1.63	1.56

Appendix C, Table 1 – Average value scores by user group. **Coding:** Cells with borders: Top 10 scores; Yellow-shaded cells: above average scores; Bolded Scores: highest score for that value (vertical columns); Italicized scores: highest score(s) for that user group (horizontal rows); Red font: lowest 10 scores.

River Management Preferences Results by User Group

"Please prioritize the following hypothetical management objectives for the river and which one, if any, stands out as a top priority." The range of possible scores for the management preferences question is from 1 (lowest priority) to 5 (highest priority).

User of	Flood Safety	Water Visibility	Water Supply	Habitat	Expense	Minimal Management	Sustainability	Tributaries	Recreation	Pests
User of Riverside Parks / Playgrounds (n=42)	3.54	3.30	3.95	3.95	3.25	2.85	3.66	3.69	4.00	3.33
"Other" User (n=23)	3.59	2.45	3.64	3.82	3.45	3.09	2.95	3.45	3.41	3.45
Runner / Walker (n = 58)	3.84	2.84	3.89	4.02	3.32	3.25	3.20	3.67	3.61	3.35
Resource Manager (n=11)	3.18	3.55	3.36	4.27	2.82	3.36	3.45	3.73	3.64	3.55
Neighbor / Passive Appreciator (n=81)	3.78	3.16	4.07	3.94	3.60	2.89	3.60	3.84	3.63	3.56
Environmental Advocate (n=91)	3.37	2.70	3.84	4.53	3.18	3.45	4.22	3.99	3.43	3.30
Horseback Rider (n=8)	3.38	3.00	4.25	4.13	2.75	2.13	3.13	4.00	4.00	3.50
Hunter / Fisherman (n = 17)	3.41	2.88	3.59	3.88	3.06	2.00	2.88	3.35	3.12	2.82
Bike Rider (n = 110)	3.65	2.65	3.39	3.49	2.85	2.75	3.05	3.27	3.54	2.94
Birder (n= 59)	3.48	2.96	3.60	4.75	3.14	3.29	3.77	3.98	3.26	3.07

Appendix C, Table 2 – Average management preferences scores by user group **Coding:** Cells with borders: Top 10 scores; Yellow-shaded cells: above average scores; Bolded Scores: highest score for that value (vertical columns); Italicized scores: highest score(s) for that user group (horizontal rows); Red font: lowest 10 scores

More Results by Location

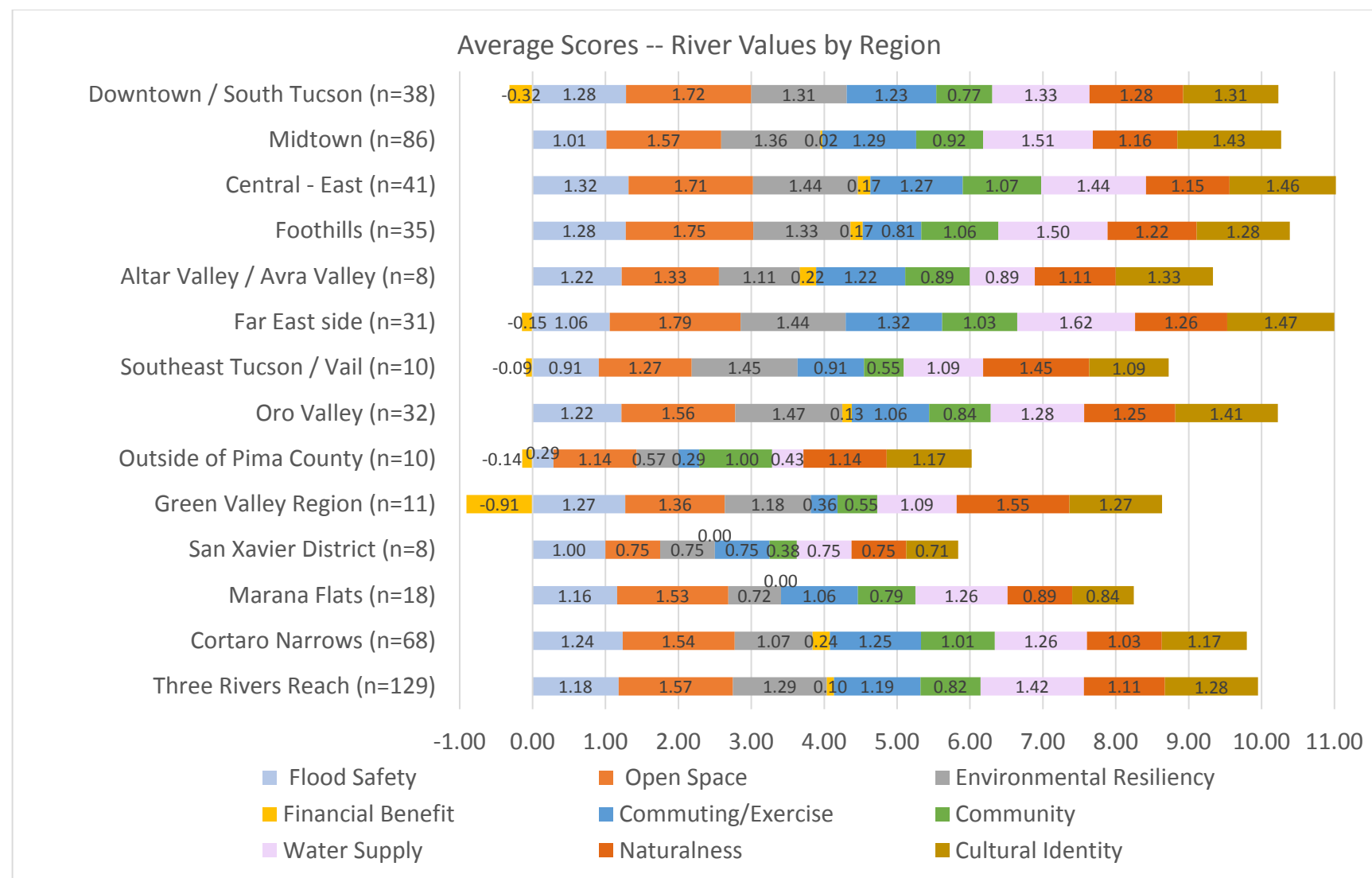
Survey respondents were asked to record their zip code. Zip codes were grouped into regional geographies and their responses averaged using the same process as above. Zip code groupings are provided in table C-3 below. Sample size varies among each geography, and additional outreach would be required to draw accurate place-based conclusions for some areas.

Regional Name	Sample Size	Zip Code (s)					
Three Rivers Reach	129	85705	85741*	85745			
Cortaro Narrows	68	85741*	85742	85743			
Marana Flats	18	85653	85658				
San Xavier District	8	85746					
Green Valley Region	11	85614	85622	85645			
Outside of Pima County	7	85627	85646	85648	85835	95705	"Maricopa County"
Oro Valley	32	85704	85737	85738**	85739	85755	
Southeast Tucson / Vail	10	85710	85715	85748	85749		
Far East side	31	85641	85730	85747			
Altar Valley / Avra Valley	8	85735	85736	85757			
Foothills	35	85718	85750				
Central - East	41	85712	85711				
Midtown	86	85716	85719				
Downtown / Southern Tucson	38	85701	85706	85713	85714	85756	
*85741 was added to both reaches since there's considerable overlap							
**85738 is a typo, but was lumped into Oro Valley with both -37 and -39.							

Appendix C, Table 3 – Zip codes included in each regional geography

River Values by Geography

"Please indicate how much you agree with the following statements about this stretch of the Santa Cruz River (Grant Road to Trico Road)."

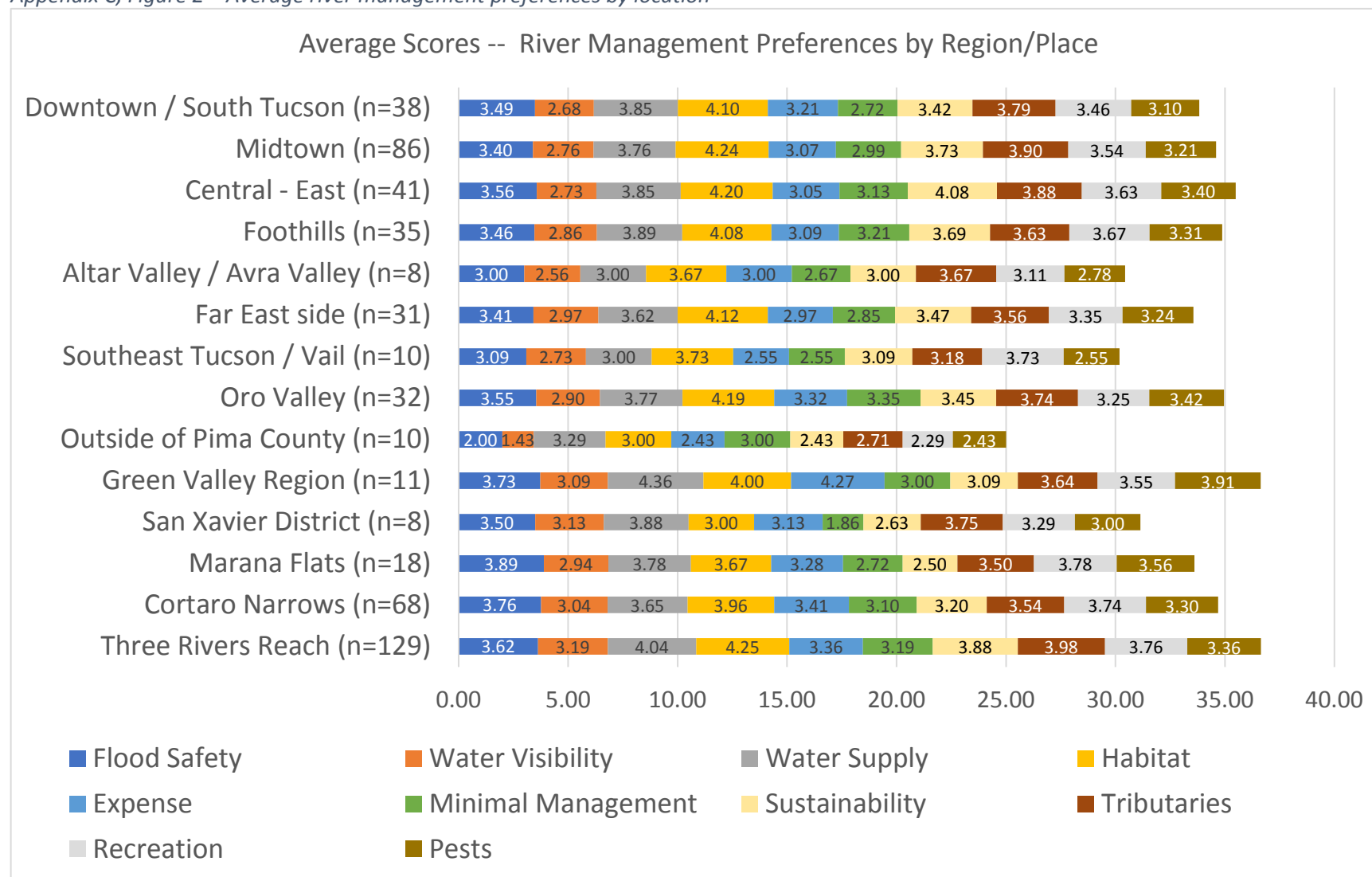


Appendix C, Figure 1 – Average river values by location

River Management Preferences by Geography

"Please prioritize the following hypothetical management objectives for the river and which one, if any, stands out as a top priority."

Appendix C, Figure 2 – Average river management preferences by location



Appendix D – Interactive Map Questions

How do you use this location?

- A - birding
- B - fishing
- C - running / walking
- D - bring tourists here
- E –frisbee golf
- F - park use
- G - horseback riding
- H - bike riding
- I - other (please explain)

How often do you usually visit this area?

- A - once a week or more
- B - several times per month
- C - several times per year
- D - once per year
- E – never

How satisfying are the current conditions in this area?

- A - very satisfying
- B - somewhat satisfying
- C - neutral/no opinion
- D - somewhat dissatisfying
- E - very dissatisfying

Why do you choose to spend time here? *(Choose all that apply or add your own)*

- A - convenient location
- B - easy access to the river from parking
- C - water is visible from here
- D - has enough amenities (parking, bathrooms, picnic tables etc)
- E - natural features, (vegetation, wildlife, fish, etc)
- F - popular site with other people who share my interests

Community Values and Management Preferences

G - quiet

H - safe

I – clean

J – other (please explain)

What are your concerns about this area? *(Open ended)*

What could be done to improve this location? *(Choose all that apply or add your own)*

A - no changes are necessary

B - Trash Clean Up

C - increased maintenance of existing amenities

D - "small" amenities, specify: trash cans, bike racks, benches, picnic tables, pet waste bags, other?

E - "large" amenities, specify: drinking fountains, parking, shade structures, improved access to the river, other?

F - information, specify: educational displays, directional signs, other?

G - community enhancements, specify: a bulletin board, trailhead sign-in sheets, other?

H - public events at this location, specify: volunteer days, tours, celebrations, other?

I - a "wildness" feel, such as natural features to conceal man-made features or vegetation restoration

J – other (please explain)

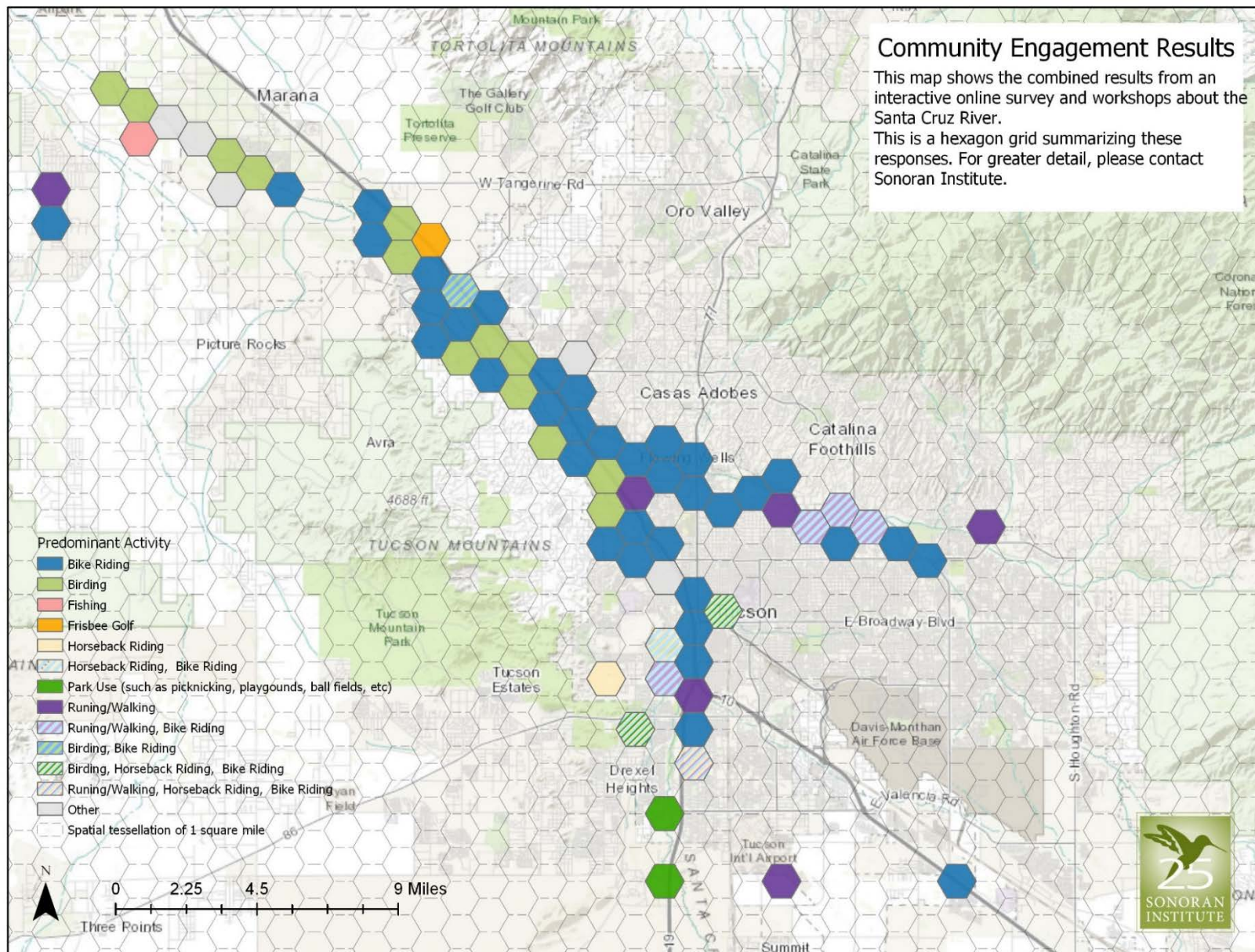
Appendix E – ArcGIS Data and Additional Maps

The interactive map was hosted on ESRI's ArcGIS online platform. Basemap data was provided by Pima County and Sonoran Institute. Map users were instructed to click on their favorite place within the project area, and to answer a short list of questions (Appendix D). Some questions were multiple choice, and some were short answer. Users could illustrate where and how they used the Santa Cruz River. The project area (river corridor between Grant Road and Trico Road) was emphasized on the map and most points occur in that focus area. However, map users were not restricted to the project area, and data from other reaches and washes is kept.

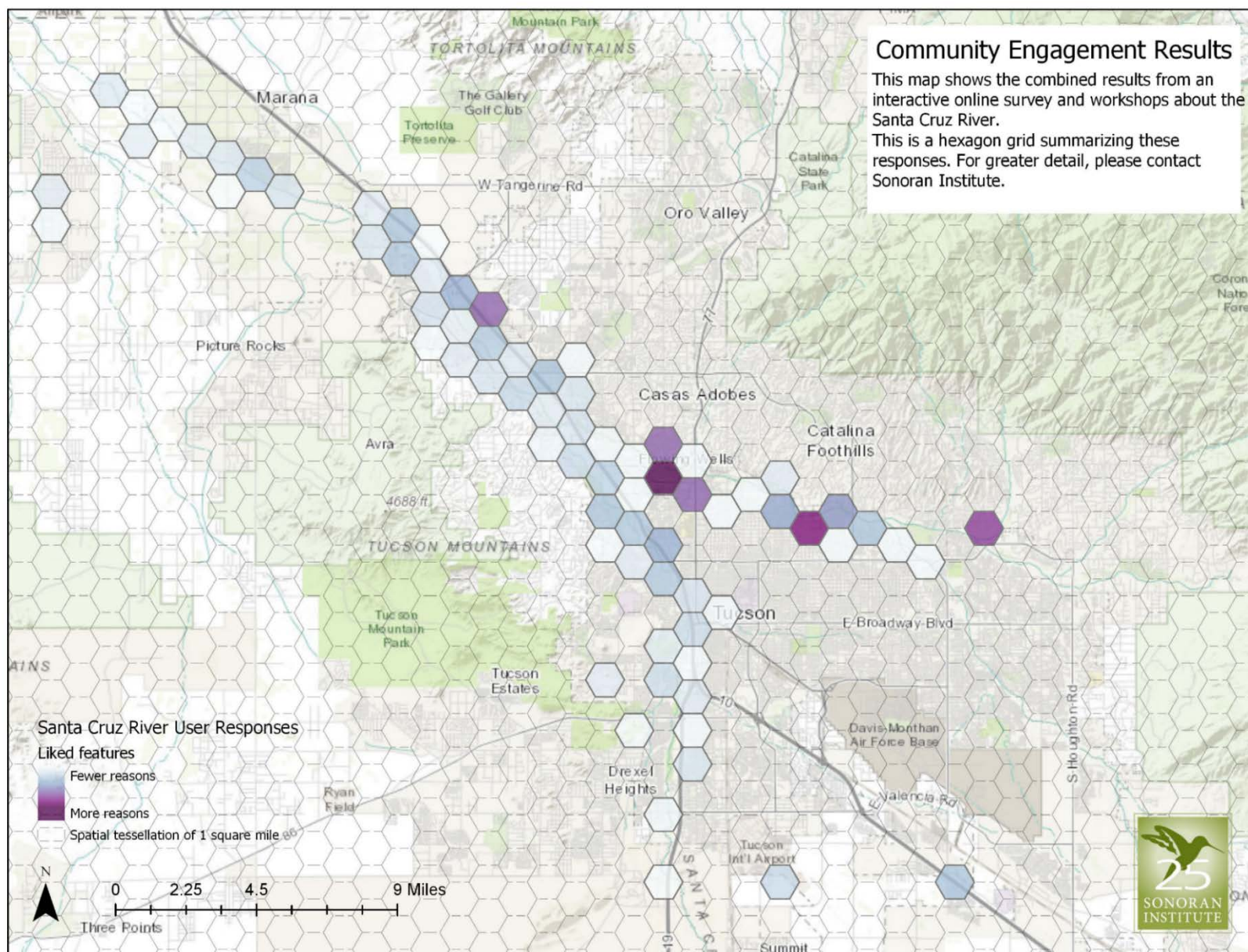
The online interactive map collected point and line data. The paper maps from the workshops produced only point data. To integrate all the data into one file for comparison, the lines from the online interactive maps were converted into points at the midpoint. Lines can be recreated because total length of the line was maintained in the attributes. Then all point data were compiled into one master shapefile.

A unique analysis process was used to visualize the specific types of activity and “likes” a unique process was used to analyze the spatial data. The Santa Cruz River users master point database was translated to a hexagon grid as both a spatial analysis and visualization technique. Using a hexagon grid solves having an excess of dots in a map, and having several attributes within the same response that overlap, that thus make the map difficult to read. It also protects the precise location of the response, in the case of sensitive data like an address. Additionally, it allows to quantify variables in a homogeneous scale, which helps make sense of the data.

This was done overlaying a grid of square-mile hexagons and summarizing the dots falling within each block, so each represents the number of dots within that area, or the quantified coded responses.



Appendix E, Figure 1 – Predominant type of activity



Appendix E, Figure 2 - Most "liked" areas



Cover images: (front) Bill Hatcher, 2018; (back) Sonoran Institute

Conditions on the Santa Cruz River in northwest Tucson and Marana have improved, and residents are noticing. Understanding how residents feel about their river is important to making informed management decisions. This report analyzes results from community workshops and surveys that begin to outline community preferences for our living river.

GET INVOLVED

- Stay informed with our work. Sign up at www.sonoraninstitute.org
- Learn more about the Santa Cruz River and read the Living River reports online. Visit www.tiny.cc/livingriver
- Watch Pima County's short video about the Santa Cruz River. www.tiny.cc/livingrivervideo2017
- Have your child enter the Living River of Words Poetry and Art Contest. Sign up at www.pima.gov/nrpr
- Visit the Santa Cruz to see the Living River for yourself! Find a trail access point at www.pima.gov/TheLoop

